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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

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Operation and Maintenance Manual

725 and 730 OEM Articulated Trucks

WWA1-Up (Machine)
WWB1-Up (Machine)

i03579720

Maintenance Interval Schedule

SMCS Code: 1000; 7000

Ensure that all safety information, warnings and instructions are read and understood before any operation or any maintenance procedures are performed.

The user is responsible for the performance of maintenance, including all adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging. Failure to adhere to proper maintenance intervals and procedures may result in diminished performance of the product and/or accelerated wear of components.

Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, in order to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance.

Note: Before each consecutive interval is performed, all maintenance from the previous interval must be performed.

When Required

Automatic Lubrication Grease Tank - Fill 106
Battery - Recycle 108
Battery or Battery Cable - Inspect/Replace 108
Cab Air Filter - Clean/Replace 113
Circuit Breakers - Reset 114
Display and Camera - Clean 122
Engine Air Filter Primary Element - Clean/Replace 124
Engine Air Filter Secondary Element - Replace .. 125
Ether Starting Aid Cylinder - Replace 131
Fuses - Replace 139
Radiator Core - Clean 147
Tire Inflation - Check 153
Window Washer Reservoir - Fill 163
Window Wiper - Inspect/Replace 163
Windows - Clean 164

Every 10 Service Hours or Daily

Backup Alarm - Test 108
Brakes, Indicators and Gauges - Test 111
Engine Oil Level - Check 126
Seat Belt - Inspect 150
Wheel Nut Torque - Check 163

Every 50 Service Hours

Body Pivot Bearings - Lubricate 109
Cooling System Coolant Level - Check 116
Fuel System Water Separator - Drain 137
Fuel Tank Water and Sediment - Drain 138
Hoist Cylinder Bearings - Lubricate 140
Hydraulic System Oil Level - Check 143
Oscillating Hitch - Lubricate 146
Steering Cylinder Bearings - Lubricate 151
Suspension and Suspension Cylinder Bearings - Lubricate 152
Torque Converter and Transmission Oil Level - Check 157
Transfer Gear Oil Level - Check 161

Initial 500 Service Hours

Engine Valve Lash - Check 130
Oscillating Hitch - Adjust 145

Initial 500 Hours (for New Systems, Refilled Systems, and Converted Systems)

Cooling System Coolant Sample (Level 2) - Obtain 117

Every 500 Service Hours

Belts - Inspect/Adjust/Replace 108
Brake Pads - Check 110
Braking System - Test 112
Differential and Final Drive Oil Level - Check 121
Differential and Final Drive Oil Sample - Obtain .. 122
Engine Crankcase Breather - Clean 125
Engine Oil Sample - Obtain 126
Engine Oil and Filter - Change 127
Fuel System - Prime 134
Fuel System Primary Filter - Clean/Inspect/Replace 135
Fuel System Secondary Filter - Replace 136
Fuel Tank Cap and Strainer - Clean 137
Hydraulic System Oil Sample - Obtain 144
Hydraulic Tank Strainer - Clean/Inspect/Replace 145
Secondary Steering - Test 150
Torque Converter and Transmission Oil Filter - Replace 156
Torque Converter and Transmission Oil Sample - Obtain 158
Transfer Gear Oil Sample - Obtain 162

Every 1000 Service Hours

Hydraulic System Oil Filter and Screen - Clean/Inspect/Replace 142
Oscillating Hitch - Adjust 145
Rollover Protective Structure (ROPS) - Inspect .. 148
Torque Converter and Transmission Oil - Change 153
Transfer Gear Oil - Change 159
Transfer Gear Oil Filter - Replace 160

Every 2000 Service Hours

Axle Breathers - Clean/Replace 107
Brake System Air - Purge 111
Differential and Final Drive Oil - Change 120

Engine Valve Lash - Check 130
Engine Valve Rotators - Inspect 130
Frame and Body - Inspect 131
Hydraulic Tank Breather - Clean/Inspect/ Replace 144
Refrigerant Dryer - Replace 148

Every 2000 Service Hours or 1 Year

Suspension System - Check 152

Every Year

Brake Accumulator (Service) - Check 109

Every 3000 Service Hours

Cooling System Coolant Extender (ELC) - Add ... 116
Cooling System Coolant Sample (Level 1) - Obtain 117
Cooling System Pressure Cap - Clean/Replace .. 118

Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

Seat Belt - Replace 150

Every 4000 Service Hours

Hydraulic System Oil - Change 141

Every 5000 Service Hours

Crankshaft Vibration Damper - Inspect 119

Every 5000 Service Hours or 3 Years

Drive Shaft Universal Joints - Inspect/Replace ... 123

Every 6000 Service Hours

Cooling System Coolant (ELC) - Change 114
Cooling System Water Temperature Regulator - Replace 118

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Automatic Lubrication Grease Tank - Fill (If Equipped)

SMCS Code: 7540-544-TNK

If the yellow LED on the signal lamp is illuminated, the minimum grease level in the reservoir has been reached.

- Ensure that the filler hose is primed with grease in order to prevent air from being introduced in the grease reservoir.

g01074471

Illustration 115

Location of the coupling on the lubrication pump

- Remove the dust cap from the coupling for the filler.
- Carefully clean the coupling for the filler and the coupling on the filler hose. The coupler for the filler hose is supplied with each Autolube system.
- Fix the filler hose on the coupling for the filler.

g01076025

Illustration 116

The maximum level mark on the lubrication pump

- Fill the reservoir up to the maximum level that is indicated on the reservoir.
- Remove the filler hose and fit the dust cap.
- Place the filler hose back in the hose's proper place in order to ensure that the coupling of the filler hose remains clean.

Note: Every 500 service hours replace the filter or every 500 service hours clean the filter for the filler on the lubrication pump. The filter is behind the connector on the reservoir.

Note: If the pumping action seems to go heavy, check the filter behind the coupling for the filler on the lubrication pump. Gently clean the filter or replace the filter. If the filter is damaged, the filter must be replaced.

Note: If too much grease is pumped into the reservoir, the surplus grease will exit the vent at the side of the lubrication pump. Any air that is introduced during the filling procedure will also escape via this route.

Note: Due to the slow capability of a hand held grease gun, the use of a grease gun is not recommended in order to fill the reservoir.

Periodic Checks

- Check the grease level in the reservoir. Refill the reservoir on time.
- Check that the signal lamp is functioning.
- Check that the duty cycle that is indicated on the signal lamp is correct for the operating conditions.
- Check the lubrication pump for damage and check the lubrication pump for leakage.
- Check the grease lines for damage and check the grease lines for leakage.
- Check the conditions of the grease points that are served by the system. Sufficient fresh grease should be present.
- Check the operation of the system. Perform a cycle test. Refer to System Operation, Testing and Adjusting, RENR6739 for more information.
- Clean the lubrication pump and clean the surroundings of the lubrication pump.
- Every 500 hours replace the filter or every 500 hours clean the filter.

Note: When you use high pressure water or high pressure air to clean the machine, do not spray directly onto the lubrication pump. Water or dirt may enter the lubrication pump through the de-arating openings.

Note: The automatic lubrication system reduces the time and effort that is taken in order to grease the machine significantly. However, do not neglect grease points that are not served by the automatic lubrication system.

Grease Recommendations

Grease should not contain graphite or PTFE. Use the correct grease in the automatic lubrication system.

The use of a partially fluid grease that is above the maximum temperature that is indicated in Table 18 is not permitted. Use of a partially fluid grease that is above the maximum indicated temperature can lead to the following.

- Excessive component wear
- A reduction in the efficiency of the system

Table 18

Minimum operating temperature of the system	Maximum operating temperature of the system	Prescribed NLGI Grade
−25 °C (−13 °F)	80 °C (176 °F)	2
−25 °C (−13 °F)	0 °C (32 °F)	0/1
−25 °C (−13 °F)	80 °C (176 °F)	SYNTHETIC 2
−25 °C (−13 °F)	0 °C (32 °F)	SYNTHETIC 0/1

i03579780

Axle Breathers - Clean/Replace

SMCS Code: 3278-070-BRE; 3278-510-BRE

Park the machine on a level surface. Move the parking brake control to the ENGAGED position. Lower the truck body or OEM attachment and shut off the engine.

Install the Steering Frame Lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

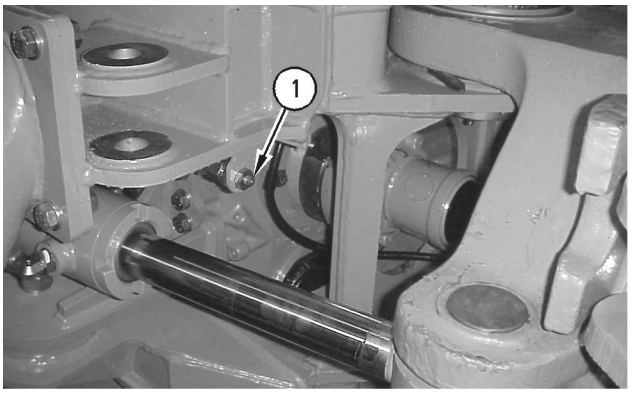

Illustration 117 g00679632

Front axle breather (1) is mounted on the left side of the front frame.

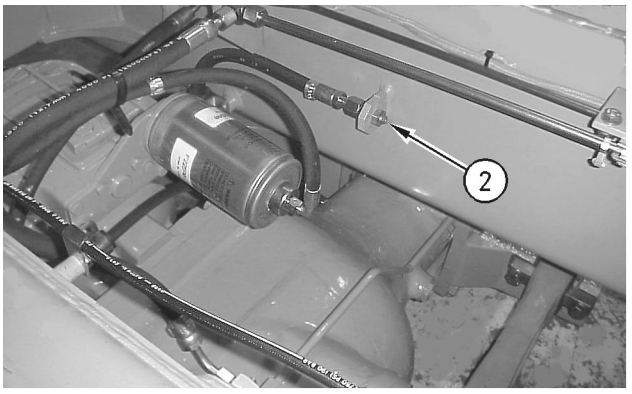

Illustration 118 g00679631

Center axle breather (2) is mounted on the right side of the rear frame.

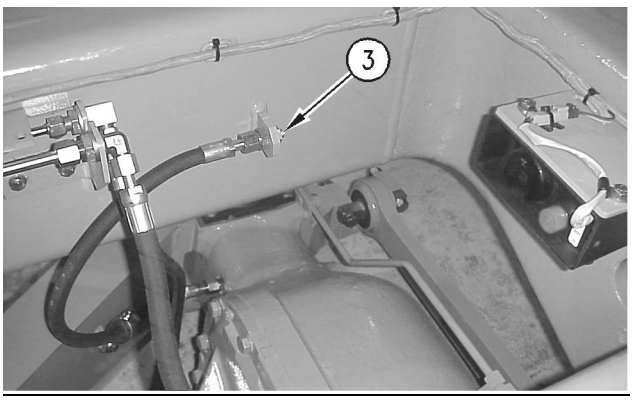

Illustration 119 g00679629

Rear axle breather (3) is mounted on the right side of the rear frame.

Note: Before you remove the breathers, block the front frame of the machine.

1. Remove each axle breather.

2. Wash each breather in a clean nonflammable solvent.

3. Shake each breather until the breather is dry.

4. Install each breather.

If any of the axle breathers are damaged, replace the damaged breather.

Remove the Steering Frame Lock once all the axle breathers are installed. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

i02305428

Backup Alarm - Test

SMCS Code: 7406-081

The backup alarm is on the rear of the machine.

Turn the engine start switch to the ON position in order to perform the test.

Apply the service brakes. Move the transmission control lever to the REVERSE position.

The backup alarm should start to sound immediately. The backup alarm will continue to sound until the transmission control lever is moved to the NEUTRAL position or to the FORWARD position.

i02039199

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery. Return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- A recycling facility

i01951790

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-510; 1402-510

Inspect the condition of the cables to the batteries and inspect the condition of the batteries.

Note: When you replace the batteries, always use the same type of battery.

Use the following procedure in order to isolate the batteries if any repairs are necessary.

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.

2. Turn the battery disconnect switch to the OFF position. Remove the key.

3. At the battery disconnect switch, disconnect the negative battery cable that is connected to the frame.

Note: Do not allow the disconnected battery cable to contact the disconnect switch.

4. Disconnect the negative battery cable from the terminals of the batteries.

5. Perform the necessary repairs. Replace the cables or the batteries, as needed.

6. Connect the negative battery cable to the terminals of the battery.

7. Connect the negative battery cable at the battery disconnect switch.

8. Install the key for the battery disconnect switch. Turn the key to the ON position.

i02210445

Belts - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-040; 1357-510

The engine is equipped with a belt that drives the alternator and the air conditioner.

Note: The engine is equipped with a belt tensioner that automatically adjusts the belt to the correct tension.

1. Park the machine on a level surface. Engage the parking brake. Shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

3. Remove the pulley guard.

4. Inspect drive belt (1). Check the belt for wear, fraying or cracking. If the belt is damaged, replace the belt.

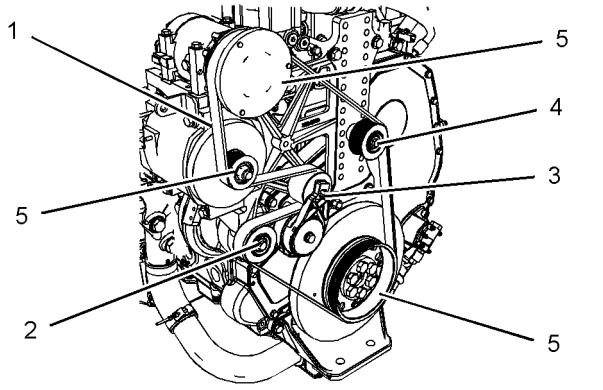

Illustration 120 g01127107

5. If belt (1) requires replacement, insert a square drive into the hole in tensioner (3) and turn counterclockwise in order to release the tension from the belt.

6. Remove the belt from the engine.

7. In order to Install a new belt, insert a square drive into the hole in tensioner (3) and turn counterclockwise.

8. Install belt (1) in the following order: tensioner (3), idler (2), drive pulleys (5), and idler (4).

9. Install the pulley guard.

10. Lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i03579844

Body Pivot Bearings - Lubricate (OEM Attachment if Equipped)

SMCS Code: 7258-086-BD; 7424-086

Note: The OEM Articulated Truck may be equipped with either a truck body or a OEM attachment. The operation of the OEM attachment is very similar to the operation of the truck body.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and stop the engine.

Remove the caps and wipe the grease fittings before lubricant is applied. Install the caps after lubricant has been applied.

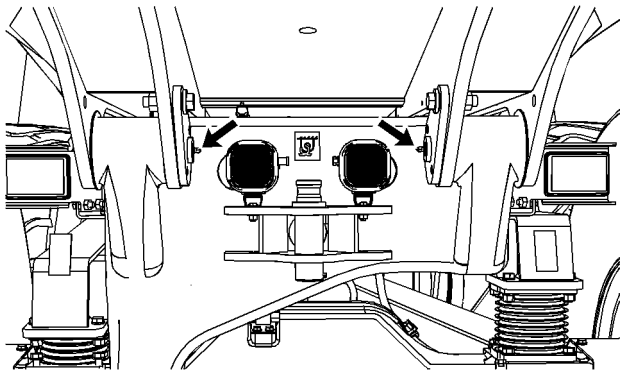

Illustration 121 g01126063

There is a total of two grease fittings. One grease fitting on the end of each pivot pin. The fittings are located at the rear of the machine.

Lubricate the pivot bearings through the grease fittings. One or two shots will be required at each fitting if lubrication is carried out at the recommended interval.

i02253515

Brake Accumulator (Service) - Check

SMCS Code: 4263-535

⚠ WARNING

Personal injury or death can result from improper accumulator charging.

Dry Nitrogen is the only gas approved for use in the accumulator. Charging the accumulator with oxygen will cause an explosion. This danger will not happen if nitrogen cylinders with standard CGA (Compressed Gas Association, Inc.) Number 580 connections are used.

When ordering nitrogen gas, be sure that the cylinders are equipped with CGA Number 580 connections. Do not use color codes or other methods of identification to tell the difference between nitrogen and oxygen cylinders

Never use an adapter to connect your nitrogen charging group to a valve outlet used on both nitrogen, oxygen, or other gas cylinders. BE SURE YOU USE DRY NITROGEN (99.8% purity).

Refer to Systems Operation, Testing and Adjusting, “Brake Accumulator (Service) - Test and Charge” for more information.

i02310318

Brake Pads - Check

SMCS Code: 4251-535; 4267-535; 4273-535

A tool can be manufactured in order to facilitate measurements by using the following information.

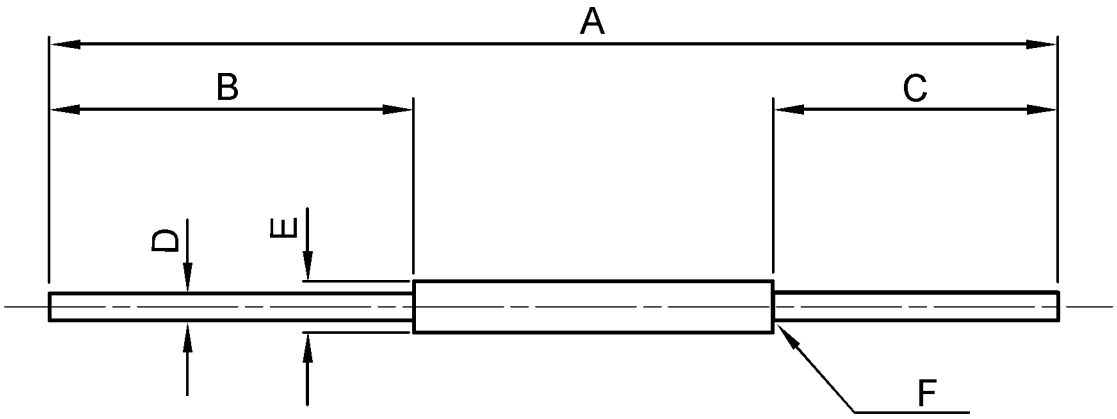

Illustration 122

g01146003

Fabricate a tool from suitable black steel stock or suitable mild steel bar. Refer to Illustration 122 and Table 19.

Table 19

Dimension	
A	235 ± 5 mm (9.25 ± 0.20 inch)
B	82 ± 0.25 mm (3.23 ± 0.01 inch)(1)
C	63 ± 0.25 mm (2.48 ± 0.01 inch)(1)
D	5.0 ± 0.25 mm (0.20 ± 0.01 inch) diameter
E	10.0 ± 0.25 mm (0.40 ± 0.01 inch) diameter
F	0.5 mm (0.02 inch) max radius

(1) This dimension is critical to the purpose of the tool.

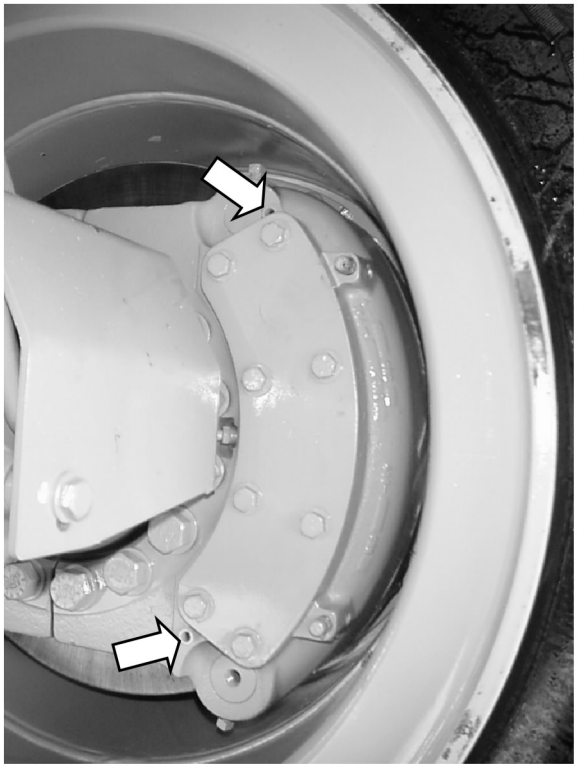

Illustration 123

g01145658

Typical example

In order to measure the thickness of the brake linings, locate the two holes on the caliper for measuring the brake linings. Refer to Illustration 123. Remove any plugs from the holes and clean the holes of any dirt.

Illustration 124 g01150338

Illustration of the correct method of taking a measurement with the tool

The step on the tool is indicated in the Illustration with an arrow.

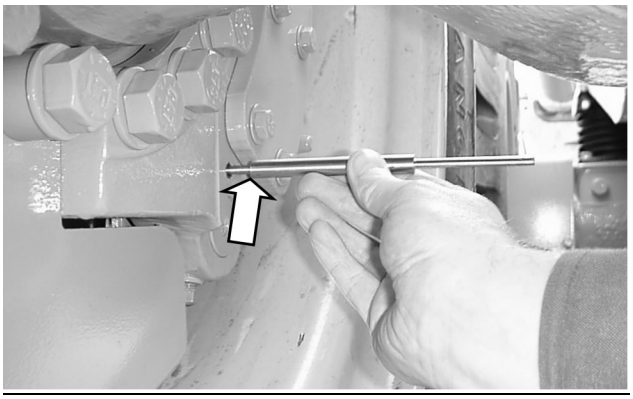

Illustration 125 g01150339

Illustration of the correct method of taking a measurement with the tool

The step on the tool is indicated in the Illustration with an arrow.

Insert the tool into one of the holes on the caliper until the end of the tool touches the brake lining or the step on the tool touches the caliper. Refer to Illustration 124 and Illustration 125.

The tool has two ends of different lengths. Due to the thickness of the casting, there is approximately a 20 mm (0.80 inch) difference between the depth of the two holes in the casting. Ensure that the correct end of the tool is used in the correct hole for measuring the thickness of the brake linings.

When the pads are worn, the step on the tool will touch the caliper. When this happens, inspect the brake linings. This indicator will show that approximately 90% of the life of the brake lining has been reached. Individual measurements must be recorded for rotors which have been machined or excessively worn.

Note: The gauge needs to be used in both holes because lining pads might not wear evenly.

i02239865

Brake System Air - Purge

SMCS Code: 4250-ABL; 4251

Routine purging of the service brake lines ensures that the system is free of air. Purge the brake groups for the center axle and purge the brake groups for the front axle.

Refer to the appropriate Systems Operation, Testing and Adjusting, “Service Brake Air - Purge” for more information.

i01514959

Brakes, Indicators and Gauges - Test

SMCS Code: 4251-081; 4267-081; 7000; 7450-081; 7490-081

Before you operate the machine, perform the following checks and make any necessary repairs.

- Look for broken lenses on the gauges, broken indicator lights, broken switches, and other broken components in the cab.
- Start the engine.
- Look for inoperative gauges.
- Turn on all machine lights. Check for proper operation.
- Sound the forward horn.
- Test the service brakes. Refer to Operation and Maintenance Manual, “Braking System - Test”.
- Test the parking brake. Refer to Operation and Maintenance Manual, “Braking System - Test”.
- Stop the engine.

i03579861

Braking System - Test

SMCS Code: 3077-081; 4251-081; 4267-081

⚠ WARNING

Personal injury can result if the machine moves while testing.

If the machine begins to move during test, reduce the engine speed immediately and engage the parking brake.

The service brake holding ability test determines whether the service brake is functional. This test is not intended to measure the maximum brake holding ability.

The holding ability of the service brakes at a specific engine rpm will be different for each machine.

The results of the test should be recorded. The results should be compared to previous test results and subsequent test results. Use the comparison as an indication of system deterioration for a particular machine.

1. Before you perform the test, ensure that you can test the brakes on a surface which is level, dry, and clear of obstacles. Fasten your seat belt. Ensure that the transmission control is in the N position and that the parking brake control is in the ENGAGED position.

   Start the engine and wait until the brake system is fully charged.

2. Engage the service brakes. Move the transmission control to the 1 position. Move the parking brake control to the DISENGAGED position.

3. Gradually increase the engine speed until the machine moves forward. Record the engine speed when the machine moves.

   Reduce the engine speed immediately and move the parking brake control to the ENGAGED position. Move the transmission control to the N position. Shut off the engine.

4. If the machine moves at an engine speed below 1200 rpm, the service brakes require service.

NOTICE
If the machine moved while testing the service brakes, contact your Caterpillar dealer.

Have the dealer inspect and, if necessary, repair the service brakes before returning the machine to operation.

Parking Brake Check

The test for the parking brake must be carried out with the rated load in the truck body or OEM attachment.

Test the service brakes and the secondary steering system on level ground before you carry out this procedure.

1. Drive the machine onto an incline of 15%. The machine must be pointing down the incline.

2. Engage the service brakes in order to stop the machine on the incline. The area around the machine must be clear of personnel and obstacles.

3. Move the parking brake control to the ENGAGED position. Move the transmission control to the N position.

4. Shut off the engine.

5. Gradually disengage the service brakes.

6. If the machine moves forward, engage the service brakes immediately. Start the engine. Disengage the parking brake and drive the machine onto level ground. Shut off the engine.

7. Check the thickness of the brake pad linings and check the thickness of the brake disc. Refer to Specifications, RENR6724, “Parking Brake”. Replace parts if the specification is not met.

If the machine moved during the test, the parking brake requires service.

NOTICE
If the machine moved while testing the parking brake, inspect the parking brake components for wear or damage. Repair or replace the worn or damaged parking brake components as required before returning the machine to service.

i03579870

Cab Air Filter - Clean/Replace

SMCS Code: 7342-070; 7342-510

NOTICE
An air recirculation filter element plugged with dust will result in decreased performance and service life to the air conditioner or cab heater.

To prevent decreased performance, clean the filter element, as required.

Both cab air filters must be serviced at regular intervals. Operating conditions will influence the service interval for the cab air filters. Inspect the filters more often in very dusty conditions. Both cab air filters are located in the right side wall of the cab.

Replace both air filters if the air filter elements have been in service for one year.

1. Park the machine on a level surface. move the parking brake control to the ENGAGED position. Lower the truck body or OEM attachment and shut off the engine.

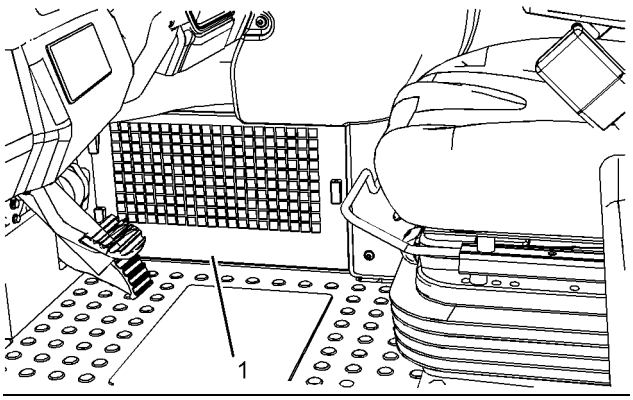

Illustration 126 g01125350

2. Remove cover (1) and remove the air filter.

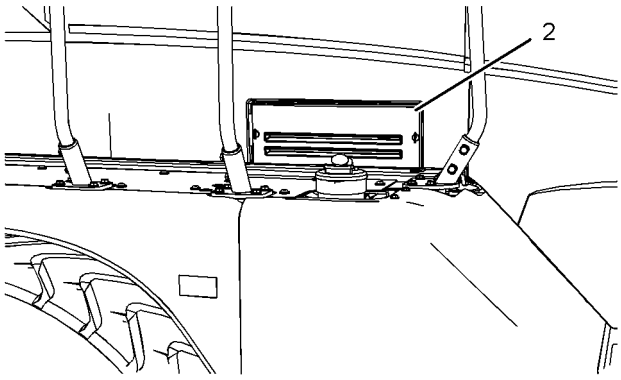

Illustration 127 g01125366

3. Remove cover (2) and remove the air filter.

4. Clean the inside of both air filter housings.

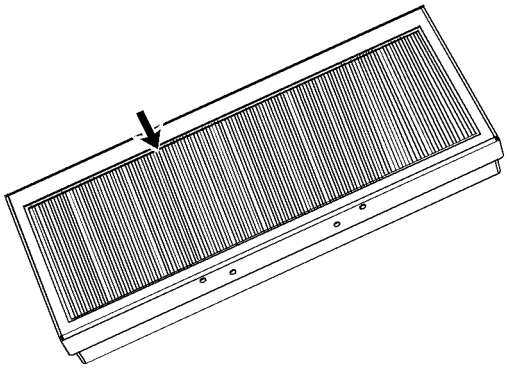

Illustration 128 g01125369

5. Inspect each air filter. If the pleats or the seals are damaged, replace the air filter.

6. If the air filter is not damaged, clean the air filter with pressurized air. the maximum air pressure for cleaning is 205 kPa (30 psi).

   Direct pressurized air along the pleats from no closer than 160 mm (6 inch) from the air filter.

   If the air filter is damaged, replace the air filter.

7. Install the air filters. Use the arrows on the air filters as a guide for correct installation.

8. Install cover (2) and cover (1).

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Circuit Breakers - Reset

SMCS Code: 1420-529

Circuit Breakers for the Alternator and for the Battery

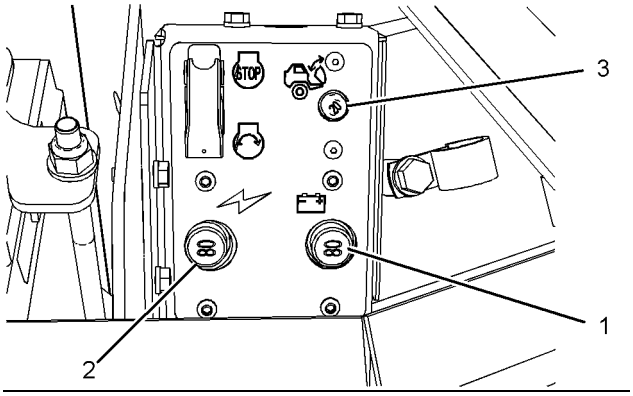

Illustration 129 g01188303

The circuit breakers for the alternator and the battery are located on the front left of the machine under a panel on the battery compartment. Circuit breaker (1) for the battery protects the battery from a dead short. Circuit breaker (2) for the alternator protects the alternator from a power surge. Reset the circuit breaker if the circuit breaker trips. Press in the button in order to reset the circuit. If the button does not remain pressed or if the circuit breaker trips soon after being reset, check the appropriate electrical circuit. Repair the electrical circuit, if necessary.

Battery (1)

Alternator (2)

Circuit Breaker for the Hood Control Switch

The circuit breaker for the hood control switch is located with the battery and alternator circuit breakers. Reset the circuit breaker if the circuit breaker trips. Press in the button in order to reset the circuit. If the button does not remain pressed or the circuit breaker trips soon after being reset, check the electrical circuit. Repair the electrical circuit, if necessary.

Hood Control Switch (3)

i03579879

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044-NL

WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

NOTICE
Do not change the coolant until you read and understand the cooling system information in Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”.

Failure to do so could result in damage to the cooling system components.

NOTICE
Mixing Extended Life Coolant (ELC) with other products reduces the effectiveness of the coolant and shortens coolant life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specification for premixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC. Failure to follow these recommendations could result in the damage to cooling systems components.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

If the coolant is dirty or if you observe any foaming in the cooling system, change the coolant before the recommended interval.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine. Do not perform this procedure until the coolant has fully cooled.

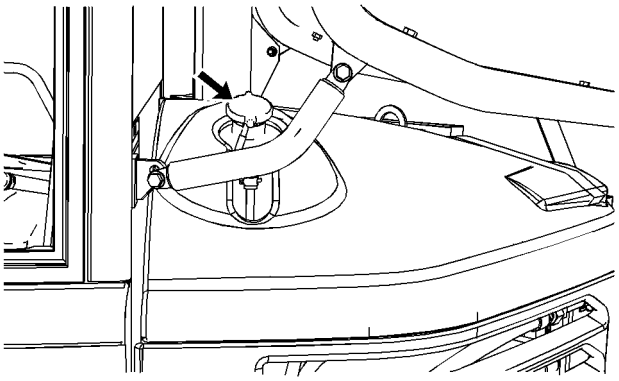

Illustration 130 g01126897

1. Slowly remove the cap in order to gradually relieve any system pressure.

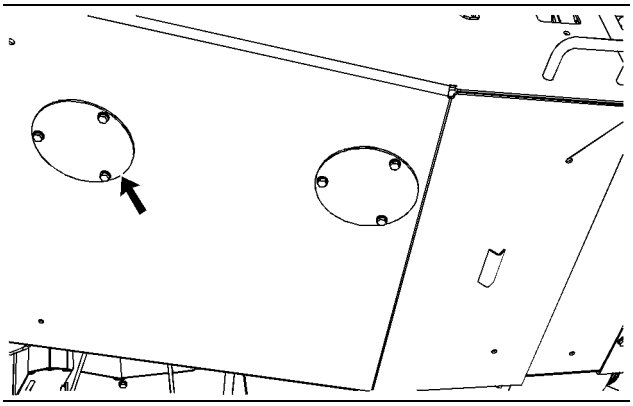

Illustration 131 g01127288

2. Remove the cover from the front of the crankcase guard in order to access the drain valve. Three bolts fasten the cover to the crankcase guard.

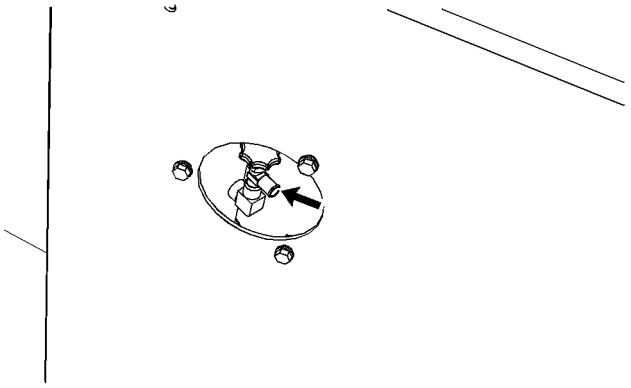

Illustration 132 g01127289

3. Open the drain valve. Allow the coolant to drain into a suitable container.

4. Close the drain valve.

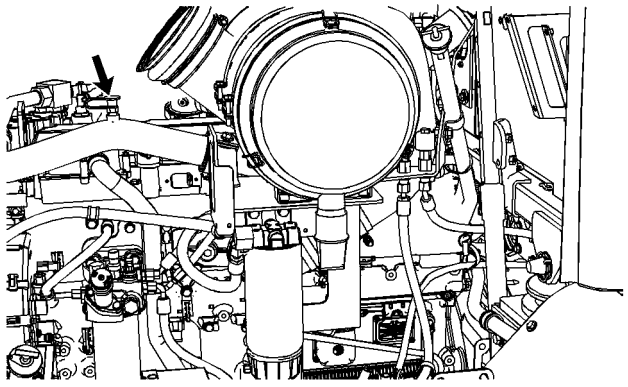

Illustration 133 g01126946

5. The tube assembly that is located near the front of the engine must be vented in order to ensure proper filling of the cooling system. Failure to vent this tube assembly may cause the water pump to cavitate. The tube assembly may be vented in one of two ways. The tube assembly may be vented by removing the 154-9024 Sampling Valve.

   The tube assembly may also be vented by purchasing a 177-9343 Fluid Sampling Cap and Probe Gp from your Caterpillar dealer. Remove the dust cap from the valve . The probe may be inserted into the 154-9024 Sampling Valve in order to vent the tube assembly. The probe must be held in place.

   Add Extended Life Coolant to the coolant tank until the tube assembly is full.

   Install the 154-9024 Sampling Valve or remove the probe. Secure the dust cap to the valve.

Add Extended Life Coolant until the level in the coolant tank is halfway between the top and the bottom of the sight glass (2).

6. Start the engine. Run the engine until the water temperature regulator opens and the coolant level stabilizes.

Note: Do not install the cap.

7. Add Extended Life Coolant until the level reaches halfway up sight glass (2). Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the required amount of Extended Life Coolant.

8. Inspect the cap. If the cap is damaged, replace the cap.

9. Install the cap.

10. Shut off the engine.

i01865470

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352-544-NL

When a Caterpillar Extended Life Coolant (ELC) is used, an extender must be added to the cooling system. See the Operation and Maintenance Manual, “Maintenance Interval Schedule” for the proper service interval. The amount of extender is determined by the cooling system capacity.

Table 20

Cooling System Capacity	Recommended Amount of Caterpillar Extender
22 to 30 L (6 to 8 US gal)	0.57 L (20 oz)
30 to 38 L (8 to 10 US gal)	0.71 L (24 oz)
38 to 49 L (10 to 13 US gal)	0.95 L (32 oz)
49 to 64 L (13 to 17 US gal)	1.18 L (40 oz)
64 to 83 L (17 to 22 US gal)	1.60 L (54 oz)
83 to 114 L (22 to 30 US gal)	2.15 L (72 oz)
114 to 163 L (30 to 43 US gal)	3.00 L (100 oz)
163 to 242 L (43 to 64 US gal)	4.40 L (148 oz)

For additional information about adding an extender, see Special Publication, SEBU6250 or consult your Caterpillar Dealer.

i03579888

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

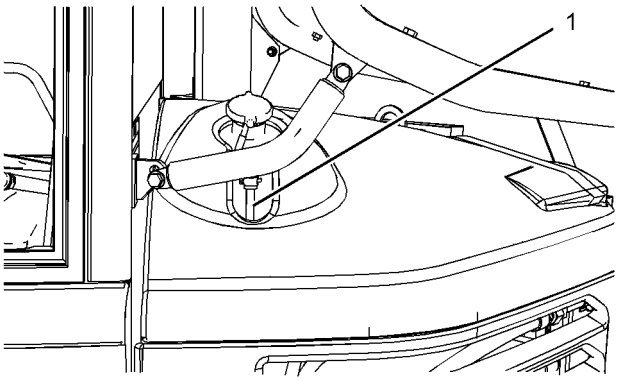

Illustration 134 g01125467

The tank for the cooling system is located at the rear of the cab.

The tank for the cooling system features a sight glass (1).

Check the cooling system level in the coolant tank. The coolant level should be maintained halfway between the top and the bottom of the transparent tube of the sight glass on the coolant tank.

Add coolant, if necessary. Refer to Operation and Maintenance Manual, “Cooling System Coolant - Change” for information on adding coolant.

i02210457

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-554

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Level 1 results may indicate a need for Level 2 Analysis.

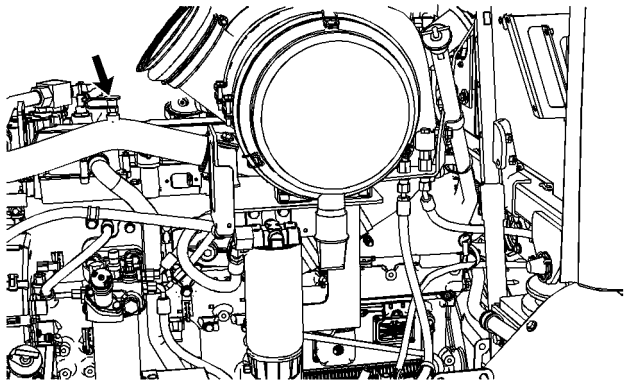

Illustration 135 g01126946

Obtain the sample of the coolant as close as possible to the recommended sampling interval. In order to receive the full effect of S·O·S analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Obtain coolant samples directly from the coolant sample port. You should not obtain the samples from any other location.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
- Never collect samples from expansion bottles.
- Never collect samples from the drain for a system.

Submit the sample for Level 1 analysis.

For additional information about coolant analysis, see Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i02210451

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-554

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

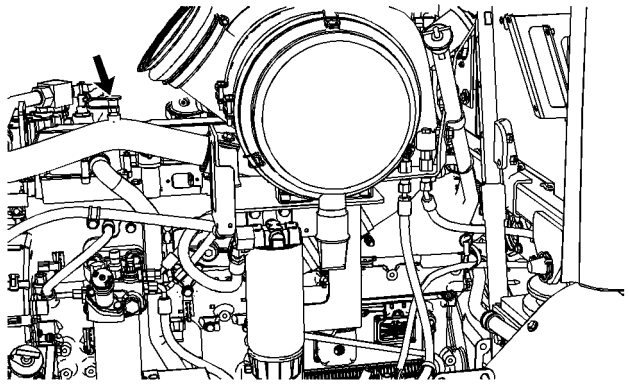

Illustration 136 g01126946

Obtain the sample of the coolant as close as possible to the recommended sampling interval. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Refer to Operation and Maintenance Manual, “Cooling System Coolant Sample (Level 1) - Obtain” for the guidelines for proper sampling of the coolant.

Submit the sample for Level 2 analysis.

Reference: For additional information about coolant analysis, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i03579898

Cooling System Pressure Cap - Clean/Replace

SMCS Code: 1382-070; 1382-510

⚠ WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine. Do not perform this procedure until the coolant has fully cooled.

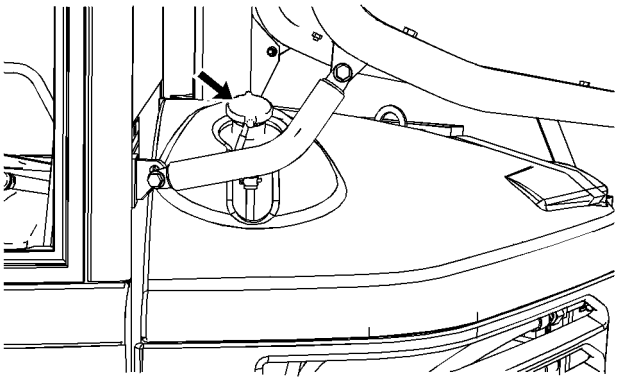

Illustration 137 g01126897

2. Remove the cap slowly in order to gradually relieve any system pressure.

3. Inspect the cap for damage, for foreign material, and for deposits. If the cap is damaged, replace the cap. If the cap is not damaged, clean the cap with a clean cloth.

4. Install the cap.

i02235376

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510

⚠ WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove filler cap slowly to relieve pressure only when engine is stopped and radiator cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Conditioner contains alkali. Avoid contact with skin and eyes.

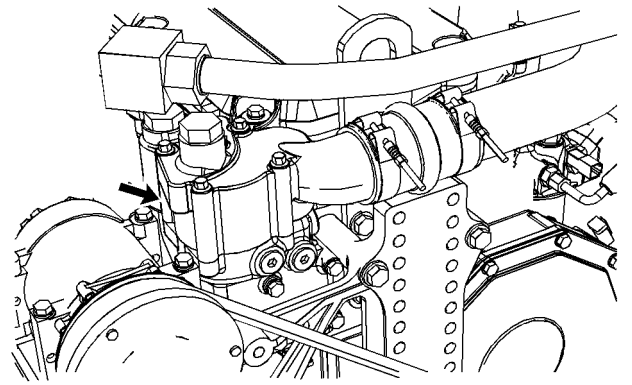

Illustration 138 g01127304

There are two water temperature regulators. The water temperature regulator housing is located at the front of the engine near the alternator.

It is necessary to remove the water temperature regulator housing in order to replace the water temperature regulators. Refer to Disassembly and Assembly, SENR9537, “Water Temperature Regulator - Remove and Install” for a typical procedure.

It is necessary to remove the alternator, the bracket for the alternator, and the drive belt. These components must be removed in order to allow the removal of the water temperature regulator housing. Refer to Disassembly and Assembly, SENR9537 for the removal procedures for these components.

Replace the water temperature regulators while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the water temperature regulator housing.

Refer to Operation and Maintenance Manual, “Cooling Syatem Coolant - Change” for information on draining the cooling system.

NOTICE
Failure to replace the engine's water temperature regulator on a regularly scheduled basis could cause severe engine damage.

NOTICE
The water temperature regulators may be reused if the water temperature regulators are within test specifications, are not damaged, and do not have excessive buildup of deposits.

NOTICE
Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a water temperature regulator.

Depending on load, failure to operate with a water temperature regulator could result in either an overheating or an overcooling condition.

NOTICE
If the water temperature regulator is installed incorrectly, it will cause the engine to overheat.

i03579907

Crankshaft Vibration Damper - Inspect

SMCS Code: 1205-040

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

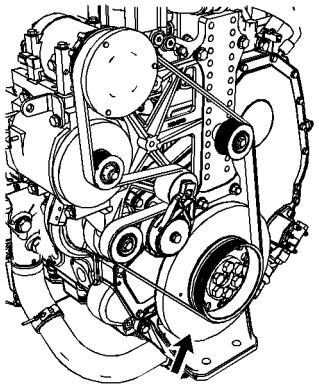

Illustration 139 g01127166

The crankshaft vibration damper can be viewed from the right side of the engine compartment.

Damage to the vibration damper or failure of the vibration damper will increase torsional vibrations. These vibrations will result in damage to the crankshaft and other engine components. A deteriorating vibration damper will cause excessive gear train noise at variable points in the speed range.

Caterpillar recommends replacing the vibration damper for any of the following reasons.

- The engine has had a failure because of a broken crankshaft.
- The S·O·S analysis detected a worn crankshaft front bearing.
- The S·O·S analysis detected a large amount of gear train wear that is not caused by a lack of oil.

Continue to use the crankshaft vibration damper if none of the above conditions are found or if the damper is not damaged.

Refer to the Disassembly and Assembly, SENR9537, “Crankshaft Vibration Damper and Pulley - Remove and Install” in order to replace the vibration damper.

i02232197

Differential and Final Drive Oil - Change

SMCS Code: 3258-044; 4050-044

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Operate the machine until the differential oil is warm. Park the machine on a level surface.

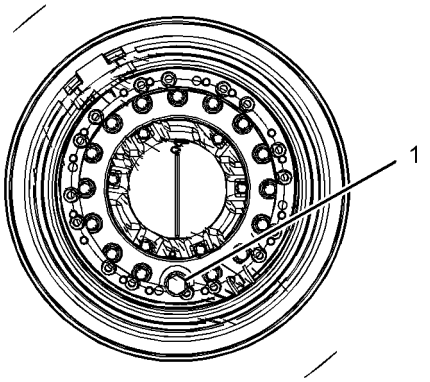

Illustration 140 g01125937

2. Slowly move the machine until plug (1) is at the lowest point on the rear left final drive. Engage the parking brake and shut off the engine.

3. Wipe the area around plug (1) on the final drive. Remove plug (1). Remove the plug slowly in order to gradually release any system pressure. Allow the oil to drain into a suitable container.

4. Clean plug (1) and inspect the O-ring seal for damage. Lubricate the O-ring seal with gear oil and install the plug.

Note: The plug is magnetic. Check the plug for ferrous particles that may indicate wear of the differential and final drive components.

5. Start the engine and disengage the parking brake.

6. Repeat Step 2 through Step 4 for the rear right final drive.

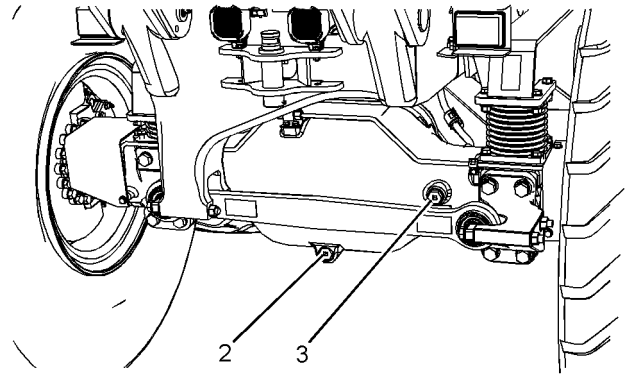

Illustration 141 g01125939

7. Remove drain plug (2) and level plug (3) from the rear axle. Remove the drain plug slowly in order to gradually release any system pressure. Allow the oil to drain into a suitable container.

8. Clean the drain plug and inspect the O-ring seal for damage. Lubricate the O-ring seal with gear oil and install the drain plug.

Note: The drain plug is magnetic. Check the plug for ferrous particles that may indicate wear of the differential and final drive components.

9. Start the engine and disengage the parking brake.

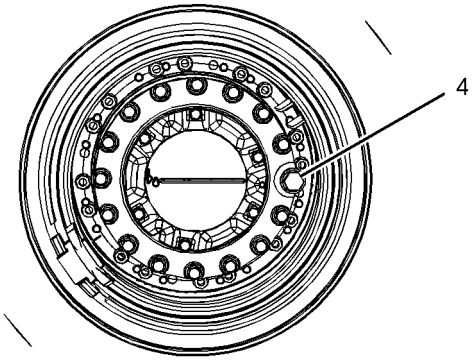

Illustration 142 g01125942

10. Slowly move the machine until “Oil Level” mark (4) on the rear right final drive is horizontal. Engage the parking brake and shut off the engine.

11. Remove plug (1) from the front right final drive and add oil to the final drive. Refer to Operation and Maintenance Manual, “Capacities (Refill)” and Operation and Maintenance Manual, “Lubricant Viscosities”.

Fill the final drive to the bottom of the plug hole. Allow the oil to flow along the axle housing and settle at a common level.

12. Install plug (1).

13. Repeat steps 9 through 12 for the rear left final drive.

14. Remove level plug (3) from the rear axle. Add oil to the differential until the differential is full. Refer to Operation and Maintenance Manual, “Capacities (Refill)” and Operation and Maintenance Manual, “Lubricant Viscosities”.

15. Install the plug.

16. Repeat the procedure for the center differential and final drives.

Repeat the procedure for the front differential and final drives.

17. Start the engine.

18. Operate the machine for a few minutes in order to circulate the oil.

19. Shut off the engine.

20. Check the oil level of the differential and final drives. Refer to Operation and Maintenance Manual, “Differential and Final Drive Oil Level - Check”.

i02582439

Differential and Final Drive Oil Level - Check

SMCS Code: 3258-535-FLV; 4050-535-FLV

1. Park the machine on a level surface and stop the engine. Perform the following steps on each of the three axles:

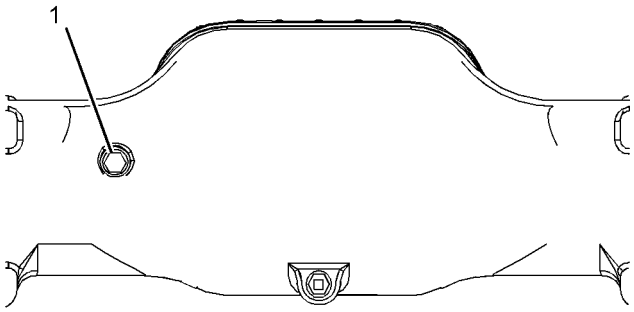

Illustration 143 g01293542

Typical example

Some models may have the filler plug toward the right side.

2. Remove differential filler plug (1) and clean the area around the opening.

3. Check the oil level. Maintain the oil level to the bottom of the filler plug opening.

4. If necessary, add oil. Install the filler plug.

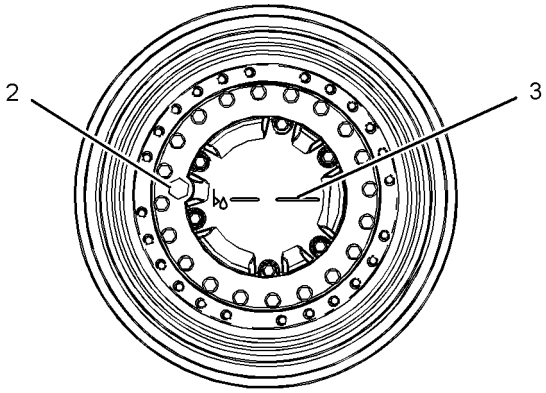

Illustration 144 g01293543

Typical Example

Note: The differential and final drives share a common oil compartment. When the machine is parked on a level surface and when the final drive oil level mark (3) is horizontal, the final drive filler plug (2) will be at the same level as the differential filler plug (1). Allow the oil to fill all of the compartments before rechecking the oil level.

i02210940

Differential and Final Drive Oil Sample - Obtain

SMCS Code: 3258-008; 4050-008; 7542-008

Note: Use a sampling gun for obtaining the oil samples.

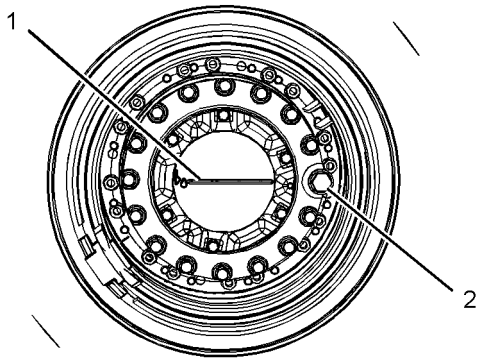

Illustration 145 g01116160

1. Park the machine on level ground. Slowly move the machine until “Oil Level” mark (1) on the front right final drive is horizontal. Engage the parking brake and shut off the engine.
2. Wipe the area around plug (2) on the final drive. Remove the plug and the O-ring seal. Remove the plug slowly in order to gradually relieve any system pressure.
3. Obtain an oil sample through the plug hole in the final drive.
4. Clean the plug and check the plug for ferrous particles that may indicate wear of the final drive and differential components.
5. Lubricate the O-ring seal with gear oil. Install the plug and the O-ring seal.
6. Start the engine.
7. Repeat Steps 1 through 6 in order to obtain oil samples from the final drives on the remaining five wheels.

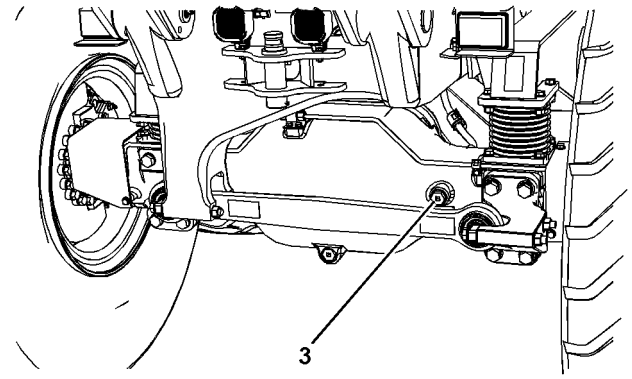

Illustration 146 g01125892

8. Wipe the area around plug (3) on the rear axle housing. Remove the plug and the O-ring seal. Remove the plug slowly in order to gradually relieve any system pressure.
9. Obtain an oil sample through the plug hole in the front axle housing.
10. Clean the plug and check the plug for ferrous particles that may indicate wear of the differential and final drive components.
11. Lubricate the O-ring seal with gear oil. Install the plug and the O-ring seal.
12. Repeat steps 8 through 11 for the center axle and the front axle.
13. Use S·O·S Oil Analysis in order to monitor the condition of the differential and final drive components.

i02449906

Display and Camera - Clean (If Equipped with Work Area Vision System)

SMCS Code: 7347-070; 7348-070

In order to maintain sufficient vision, keep the Work Area Vision System (WAVS) camera lens and the display clean.

Display

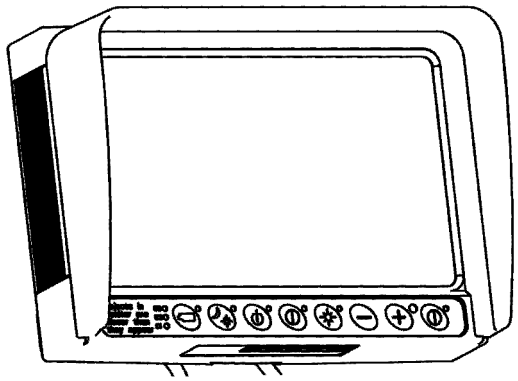

Illustration 147 g01223034

WAVS display

Use a soft, damp cloth in order to clean the display. The display has a soft plastic surface that can be easily damaged by an abrasive material. **The display is not sealed. Do not immerse the display with liquid.**

Camera

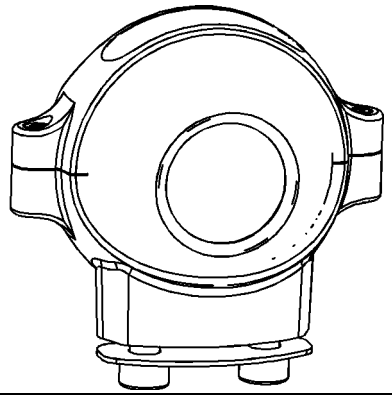

Illustration 148 g01223051

The WAVS camera is located on the rear of the machine near the taillights.

Use a damp cloth or water spray in order to clean the camera lens. The camera is a sealed unit. The camera is not affected by high pressure spray.

The camera is equipped with an internal heater to help counteract the effects of condensation, snow, or ice.

Note: For more information on WAVS, refer to Operation and Maintenance Manual, SEBU8157, “Work Area Vision System”.

i03579936

Drive Shaft Universal Joints - Inspect/Replace

SMCS Code: 3251-040; 3251-510

Park the machine on a level surface and engage the parking brake. Lower the truck body or OEM attachment and stop the engine.

Inspect

1. Place a dial indicator on the drive shaft so that the vertical end play in the spider can be measured. If the drive shaft moves more than 0.15 mm (0.006 inch) of movement relative to the yoke, the spider needs to be replaced.

2. Place the dial indicator so that the horizontal end play in the spider can be measured. If the spider has more than 0.15 mm (0.006 inch) of movement relative to the yoke, the spider needs to be replaced.

Replace

Do not reuse drive shaft bolts. Always use new drive shaft bolts when you reassemble the drive shaft.

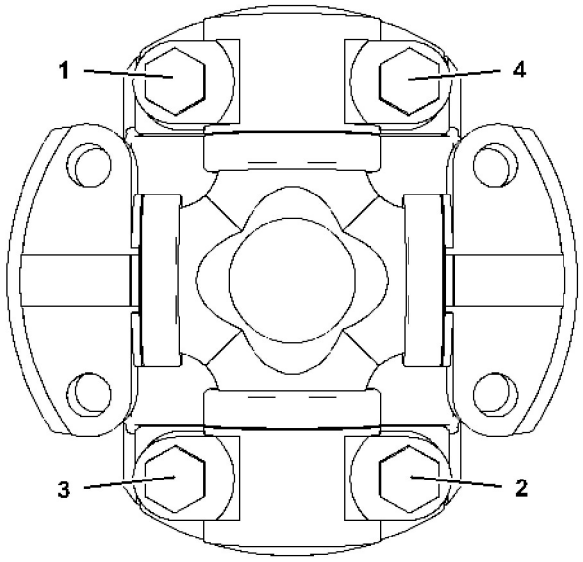

Illustration 149 g01402610

Torque sequence

1. Use four used bolts as alignment bolts. Install the used bolts. Tighten the bolts in the pattern that is shown in Illustration 149. Make sure that the yoke is fully seated against the spider. Torque the used bolts to the designed specification.

2. Remove the used bolts one at a time. Follow the pattern that is shown in Illustration 149. Install the new bolt. Torque the new bolt before removing the next alignment bolt in the pattern.

3. Check the torque of the new bolts by using the pattern that is shown in Illustration 149.

i03580034

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070-PY; 1054-510-PY

NOTICE
Service the air cleaner only with the engine stopped. Engine damage could result.

Service the primary air filter element under the following conditions.

- The indicator for the air filter is illuminated. Refer to Operation and Maintenance Manual, “Monitoring System”.
- The primary air filter element has been in service for 1000 service hours.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

1. Raise the hood.

   Refer to the Operation and Maintenance Manual, “Hood Control”.

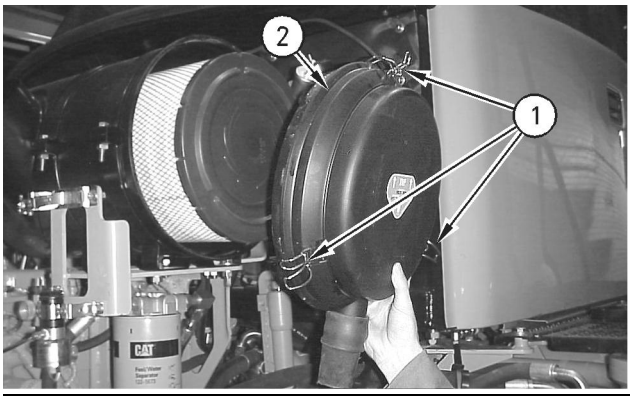

Illustration 150 g00681241

2. Release three latches (1) and remove air cleaner cover (2).

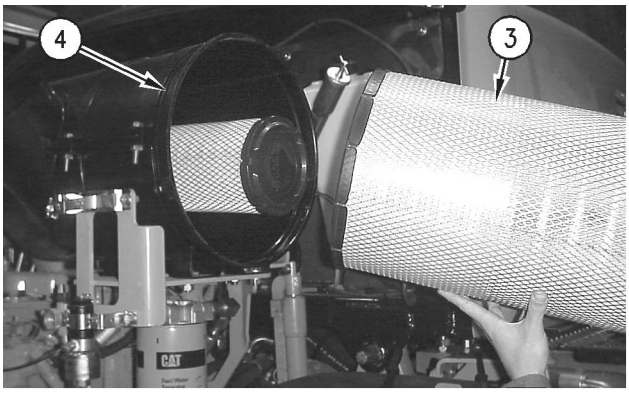

Illustration 151 g00681242

3. Primary air filter element (3) fits tightly onto air cleaner housing (4). Carefully release the seal by rocking or twisting the primary air filter element and remove the primary air filter element from the air cleaner housing. Avoid touching the primary air filter element against the sides of the air cleaner housing as this may dislodge dust from the primary air filter element.

4. Inspect the primary air filter element. If the pleats or the seals are damaged, replace the primary air filter element.

⚠ WARNING

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.

5. If the primary air filter element is not damaged, clean the inside pleats and the outside pleats. The following method may be used in order to clean the primary air filter element:

   - Pressurized air (Maximum pressure 205 kPa (30 psi))

   Direct pressurized air along the pleats from no closer than 160 mm (6 inch) from the primary air filter element.

   A primary air filter element may be cleaned for a maximum of six times. Replace a primary air filter element after one service year.

Note: Do not clean the primary air filter element by bumping or by tapping as this may damage the primary air filter element.

6. Inspect the primary air filter element before installation. If the pleats, the gaskets, or the seals are damaged, replace the primary air filter element.

7. Clean the inside of the air cleaner housing.

8. Install a clean, dry primary air filter element. ensure that the seal is made between the primary air filter element and the air cleaner housing.

9. Clean the air cleaner cover. Install the air cleaner cover and engage the latches.

10. Lower the hood.

    Refer to the Operation and Maintenance Manual, “Hood Control”.

11. Start the engine. If the indicator for the air filter is illuminated replace the secondary air filter element.

    Refer to the Operation and Maintenance Manual, “Engine Air Filter Secondary Element - Replace”.

i03580064

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

NOTICE
Always replace the secondary element. Do not attempt to reuse it by cleaning. Engine damage could result.

NOTICE
Service the air cleaner only with the engine stopped. Engine damage could result.

Replace the secondary air filter element under these conditions.

- The primary air filter element is serviced for the third time.
- The indicator for the air filter is illuminated after the primary air filter element has been serviced. Refer to Operation and Maintenance Manual, “Monitoring System”.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

1. Remove the primary air filter element.

   Refer to the Operation and Maintenance Manual, “Engine Air Filter Primary Element-Clean/Replace”.

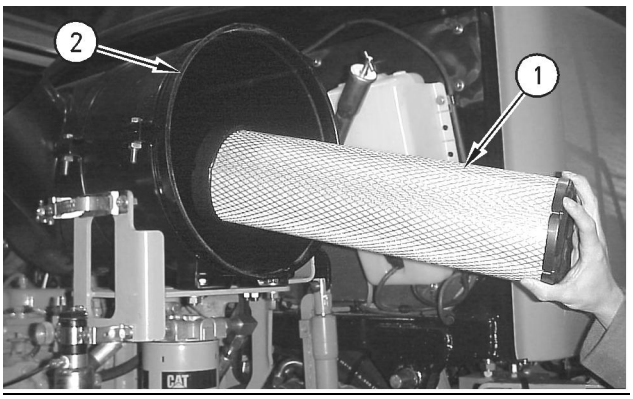

Illustration 152 g00681252

2. Carefully release the seal by rocking or twisting secondary air filter element (1). Remove the secondary air filter element from air cleaner housing (2).

3. Cover the air inlet opening. Clean the inside of the air cleaner housing.

4. Uncover the air inlet opening. Install a new secondary air filter element. Ensure that the seal is made between the secondary air filter element and the air cleaner housing.

5. Install the primary air filter element.

   Refer to the Operation and Maintenance Manual, “Engine Air Filter Primary Element-Clean/Replace”.

6. Install the air cleaner cover and engage the three latches.

7. Lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i03580099

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

1. Raise the hood.

   Refer to Operation and Maintenance Manual , “Hood Control”.

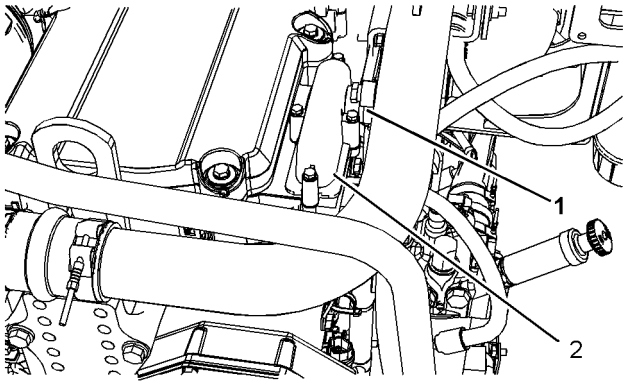

Illustration 153 g01127512

2. Loosen hose clamp (1) in order to detach the hose from the breather. Remove breather (2).

3. Wash the breather in a clean, nonflammable solvent. Wipe the breather with a clean, dry cloth. Replace the breather if the breather is damaged.

4. Inspect the breather seal. If necessary, install a new seal.

5. Ensure that the breather is dry.

6. Reposition the breather. Fasten the breather to the top of the engine. Tighten hose clamp (1) in order to fasten the hose to the breather.

7. Lower the hood.

i03302263

Engine Oil Level - Check

SMCS Code: 1000-535-FLV

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE
Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

The engine oil level can be checked when the oil is cold and the engine is shut off.

Note: Perform the cold test before you start the engine.

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

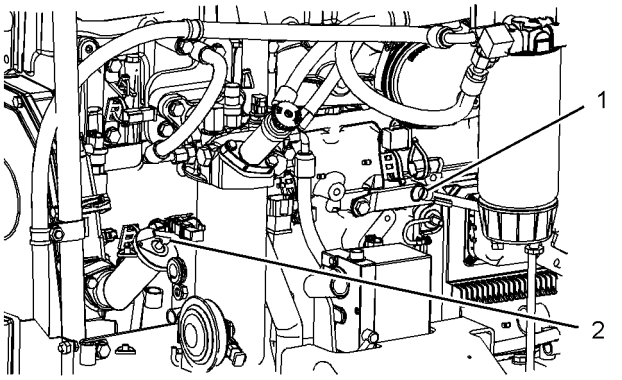

Illustration 154 g01125742

2. Remove oil level gauge (1). The oil level gauge is located beneath the hood, adjacent to the secondary fuel filter.

3. Clean the oil level gauge and reinstall the oil level gauge.

4. Remove the oil level gauge and check the oil level. The oil level should be between the “ADD” and “FULL” marks on the oil level gauge.

5. If necessary, remove cap (2) and add oil through the filler tube.

   Refer to Operation and Maintenance Manual, “Lubricant Viscosities” for the correct oil.

6. Wipe any oil from the oil level gauge. Reinstall the oil level gauge.

7. Lower the hood.

i02210439

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 7542-008

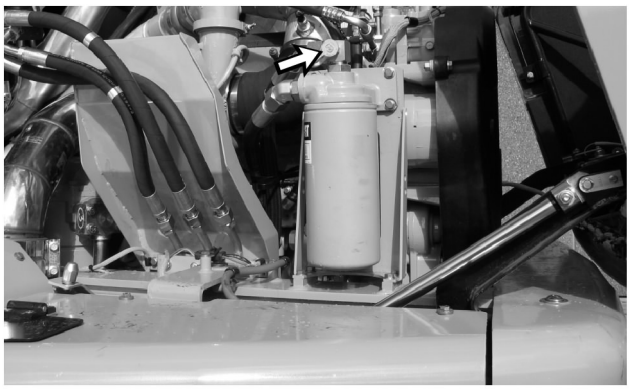

Illustration 155 g01134568

The sampling valve for the engine oil is located on the right side of the engine on the engine oil filter base.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of the engine oil.

i03580147

Engine Oil and Filter - Change

SMCS Code: 1318-510

Selection of the Oil Change Interval

NOTICE
A 500 hour engine oil change interval is available, provided that the operating conditions and recommended multigrade oil types are met. When these requirements are not met, shorten the oil change interval to 250 hours, or use an S·O·S Services oil sampling and analysis program to determine an acceptable oil change interval.

If you select an interval for oil and filter change that is too long, you may damage the engine.

Caterpillar oil filters are strongly recommended.

Recommended multigrade oil types are listed in Table 21. Do not use single grade oils.

Abnormally harsh operating cycles or harsh environments can shorten the service life of the engine oil. Operating with high load factors or with fuel sulfur levels above 0.3% may require reduced oil drain intervals. Corrosive environments or extremely dusty conditions may require a reduction in engine oil change intervals from the recommendations in Table 21.

Operating the engine in the following conditions will shorten the service life of the engine oil which will require reduced oil drain intervals:

- Low ambient temperatures
- Short operating durations
- Long idle times
- Altitudes above 1830 m (6000 ft)
- Poor maintenance of air filters or of fuel filters

See your Caterpillar dealer for more information if this product will experience abnormally harsh operating cycles or harsh environments.

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluid Recommendations” for more information.

NOTICE
The oil drain intervals specified in table 21 are based on the use of premium diesel engine oils.

The preferred oil for attaining the specified intervals is Cat DEO Multigrade.

Premium oils that meet the Cat ECF-1 (Engine Crankcase Fluid specification - 1) are second choice oils.

Premium oils that meet the API (American Petroleum Institute) CG-4 category are third choice oils. API CG-4 oils must be API licensed, and have a maximum ash level of 1.35% (wt.)

Table 21

735, 740 and 740E Articulated Trucks Oil Change Interval (1)				
Multigrade Oil Type	Operating Conditions			
	Normal(2)	High Load Factor above 41 L (10.8 US gal)per hour (3)	Severe	
			Fuel Sulfur from 0.3% to 0.5% (4)	Altitude above 1830 m (6000 ft)
Cat DEO Preferred	500 hr	500 hr	500 hr	250 hr(6)
ECF-1 11.0 minimum TBN(4) Preferred	500 hr	500 hr	500 hr	250 hr(6)
ECF-1 TBN(4) below 11.0	500 hr	500 hr	250 hr(5)	250 hr(6)
API CG-4(7)	500 hr	250 hr(8)	250 hr(8)	250 hr(8)

(1) The standard oil change interval for this engine is 500 hours, if the operating conditions and recommended oil types that are listed in this table are met. The traditional oil change interval for engines is 250 hours. Improvements in the engine allow this engine oil change interval. This new standard interval is not permitted for other engines. Refer to the applicable Operation and Maintenance Manuals for the other engines.

(2) Normal conditions include these factors: Fuel sulfur below 0.3%, altitude below 1830 m (6000 ft), and good air filter and fuel filter maintenance. Normal conditions do not include high load factor, harsh operating cycles, or harsh environments.

(3) High load factors can shorten the service life of your engine oil. Continuous heavy load cycles and very little idle time result in increased fuel consumption and oil contamination. These factors deplete the oil additives more rapidly. If the average fuel consumption of your engine exceed 51 L (13.5 US gal) per hour, follow the “High Load Factor” recommendations in Table 21. To determine average fuel consumption for your engine, measure average fuel consumption for a period of 50 to 100 hours. If the application of the engine is changed, the average fuel consumption may change.

(4) For sulfur content above 0.5%, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”, “Total Base Number (TBN) and Fuel Sulfur Levels for Direct Injection (DI) Diesel Engines”.

(5) In order to verify an oil change interval of 500 hours, refer to “Program A” below.

(6) Use “Program B” below to determine an appropriate interval.

(7)]Premium oils which meet the API (American Petroleum Institute) CG-4 category are a third choice oil. API CG-4 oils must be API licensed, and have a maximum ash level of 1.35% (WT.)

(8) Maximum oil change interval

Adjustment of the Oil Change Interval

Note: Your Caterpillar dealer has additional information on these programs.

Program A

Verification for an Oil Change Interval of 500 Hours

This program consists of three oil change intervals of 500 hours. Oil sampling and analysis is done at 250 hours and 500 hours for each of the three intervals for a total of six oil samples. The analysis includes oil viscosity and infrared (IR) analysis of the oil. If all of the results are satisfactory, the 500 hour oil change interval is acceptable for the engine in that application. Repeat Program A if you change the application of the engine.

If a sample does not pass the oil analysis, take one of these actions:

- Shorten the oil change interval to 250 hours.
- Proceed to Program B.
- Change to a preferred oil type in Table 21.

Program B

Optimizing Oil Change Intervals

Begin with a 250 hour oil change interval. The oil change intervals are adjusted by increments. Each interval is adjusted an additional 50 hours. Periodic oil sampling and analysis is done during each interval. The analysis includes oil viscosity and infrared (IR) analysis of the oil. Repeat Program B if you change the application of the engine.

If an oil sample does not pass the analysis, shorten the oil change interval, or change to a preferred multigrade oil type in the listing above.

References

Reference: Special Publication, PEDP7036, “S·O·S Services”

Reference: Special Publication, PEDP7076, “Understanding the S·O·S Oil Analysis Tests”

Reference: Special Publication, PEHP7052, “Making the Most of S·O·S Services”

Procedure for Changing Engine Oil and Filter

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog”, and to Special Publication, GECJ0001, “Cat Shop Supplies and Tools” guide for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

Note: Drain the crankcase while the oil is warm and while the oil is well circulated. This ensures that waste particles will be suspended in the oil and that these particles will be removed as the oil is drained.

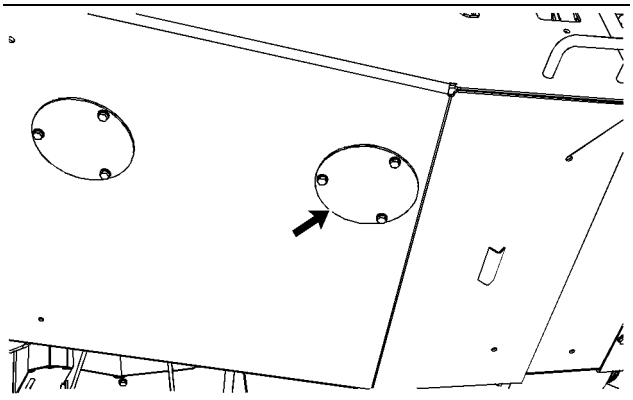

Illustration 156 g01126944

1. Remove the cover from the crankcase guard.

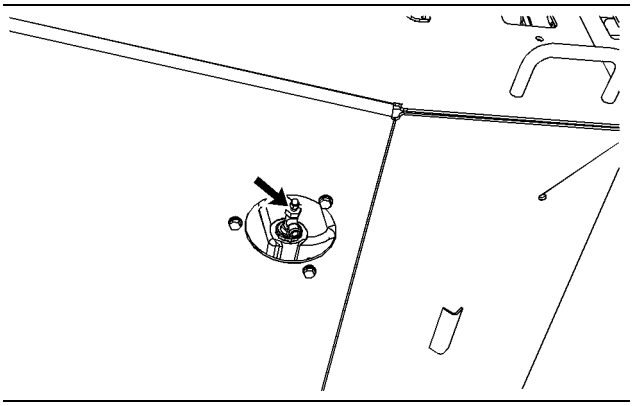

Illustration 157 g01126945

2. Attach a suitable hose to the drain valve.

3. Open the oil drain valve until oil flows from the hole. Allow the oil to drain into a suitable container.

4. Remove the hose from the drain valve. Clean the oil drain valve and close the oil drain valve.

5. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

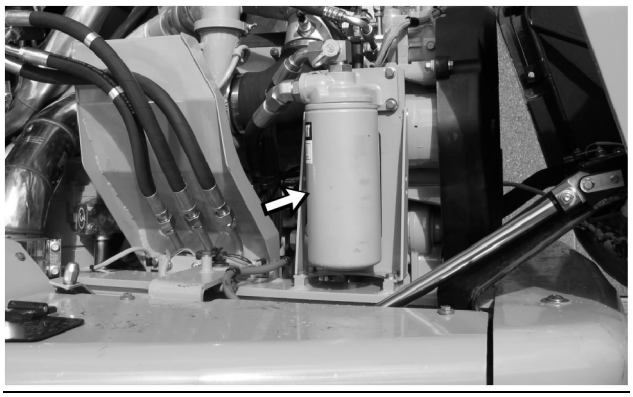

Illustration 158 g01134569

Note: The engine oil filter is remotely mounted on the right side of the engine.

6. Remove the oil filter with a strap type wrench. Discard the used oil filter properly.

Refer to the Operation and Maintenance Manual, “Oil Filter - Inspect”.

7. Clean the oil filter base.

8. Apply a thin coat of engine oil to the seal of the new oil filter.

9. Install the new oil filter by hand.

Instructions for the installation of the filter are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

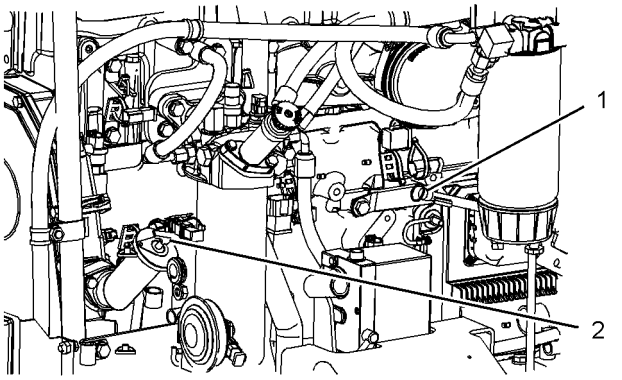

Illustration 159 g01125742

10. Remove oil filler cap (2). Fill the crankcase with new oil through the filler tube.

Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacites (Refill)”.

11. Remove dipstick (1) and then clean the dipstick. Reinstall the dipstick.

12. Remove the dipstick and check the oil level. The oil level should be between the “ADD” and “FULL” marks on the dipstick. Add oil, if necessary.

13. Start the engine and run the engine at low idle for 1 minute.

14. Repeat steps 11 and 12.

15. Close the hood and shut off the engine.

i02680477

Engine Valve Lash - Check

SMCS Code: 1105-535

Engine valve lash adjustments should be made at every 2000 hour interval.

Note: Engine valve lash adjustment on new engines or on reconditioned engines should be made at 500 hours.

Maintenance is recommended by Caterpillar for engine valve lash adjustments. The maintenance for engine valve lash is part of the lubrication and preventive maintenance schedule in order to provide maximum engine life.

NOTICE
Only qualified service personnel should perform this maintenance. Refer to the Service Manual or your Caterpillar Dealer for the complete engine valve lash adjustment procedure.

⚠ WARNING

Be sure the engine cannot be started while this maintenance is being performed. To prevent possible injury, do not use the starting motor to turn the flywheel.

Hot engine components can cause burns. Allow additional time for the engine to cool before measuring/adjusting engine valve lash clearance.

NOTICE
Operation of Caterpillar Engines with improper engine valve lash adjustments will reduce the engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

Measure the engine valve lash with the engine stopped. To obtain an accurate measurement, allow at least 20 minutes for the valves to cool to engine cylinder head and block temperature.

i00128925

Engine Valve Rotators - Inspect

SMCS Code: 1109-040

⚠ WARNING

When inspecting the valve rotators, protective glasses or face shield and protective clothing must be worn, to prevent being burned by hot oil spray.

Inspect the engine valve rotators after the valve clearances have been set.

1. Start the engine and run the engine at low idle.

2. Watch the top surface of each valve rotator. When the intake valve or the exhaust valve closes, the engine valve rotator should turn slightly.

If an intake valve or an exhaust valve fails to rotate, consult your Caterpillar Dealer.

i03580221

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456-510-CD

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.
2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”. The ether starting aid cylinder is located on the left side of the engine near the primary fuel filter.
3. Loosen the cylinder retaining clamp. Unscrew and discard the empty ether starting aid cylinder.
4. Remove the gasket. Install a new gasket. A new gasket is provided with each new ether starting aid cylinder.
5. Install a new ether starting aid cylinder. Tighten the ether starting aid cylinder hand tight. Tighten the cylinder retaining clamp securely.
6. Lower the hood.

i03580232

Frame and Body - Inspect (OEM Attachment if Equipped)

SMCS Code: 3250-040; 3260-040; 3268-040; 7000-040; 7050-040; 7113-040; 7258-040

Note: The OEM Articulated Truck may be equipped with either a truck body or a OEM attachment. The operation of the OEM attachment is very similar to the operation of the truck body.

All earthmoving equipment is prone to a high degree of wear. Regular inspections for structural damage are necessary.

These inspections are particularly important for this type of machine as the machines can experience difficult work cycles.

Regular inspections can minimize the risk of accidents. Regular inspections can reduce down time.

The interval between these inspections depends on the factors that follow.

- The age of the machine
- The severity of the application
- The loads that have been carried on the machine
- The condition of the haul road
- The amount of routine servicing that has been carried out

These inspections should be carried out at intervals no longer than 1000 service hours or six months. Older machines, or machines that are operating in severe applications will require more frequent inspections.

If the machine has been involved in a collision, or if the machine has been involved in any kind of accident, the machine must be inspected thoroughly. Inspect the machine regardless of the date of the last inspection.

The machine must be clean before the machine is inspected.

Proper repair of frames and structures requires specific knowledge of the following subjects.

- Materials that have been used to manufacture the frame members
- Frame member construction
- Repair techniques that are recommended by the manufacturer.

Consult your Caterpillar dealer if repairs are necessary. Your Caterpillar dealer is qualified to carry out repairs on your behalf.

All repairs should be carried out by a Caterpillar dealer. If you carry out your own repairs, contact your Caterpillar dealer for advice about proper repair techniques.

Particular attention should be given to all welded structures. The following items should be thoroughly inspected for cracks and for defects:

- Front frame
- Front suspension frame
- Rear frame
- Oscillating hitch
- A-frames
- Dump body

NOTICE
The areas highlighted are of particular importance but other areas must not be neglected. The entire structure must be carefully examined.

Front Frame

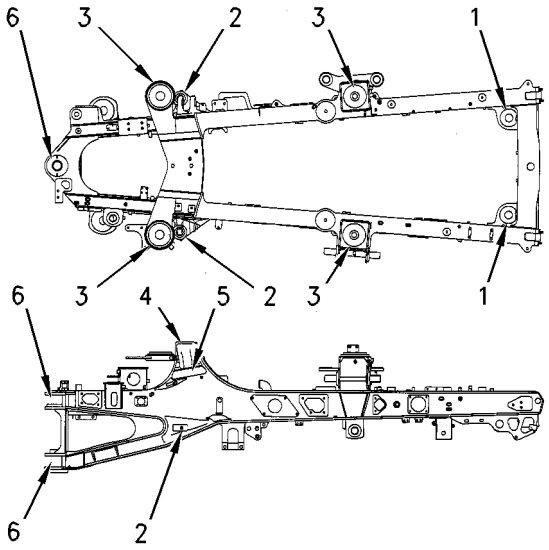

Illustration 160 g00739927

Inspect the following areas:

- Front engine mountings (1)
- Steering cylinder lugs (2)
- Cab mounts (3)
- Suspension towers (4)
- Mounting bosses (5) for the front suspension cylinders
- Rear subassembly and hitch lugs (6)

Front Suspension Frame

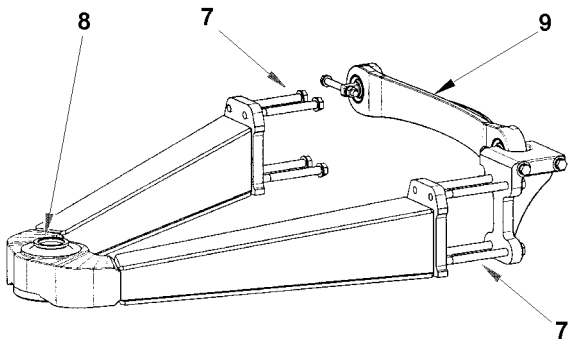

Illustration 161 g01024820

Inspect the following areas:

- Axle mountings (7)
- Pivots (8) for the A-frame
- Stabilizer rod (9) and mountings

Oscillating Hitch

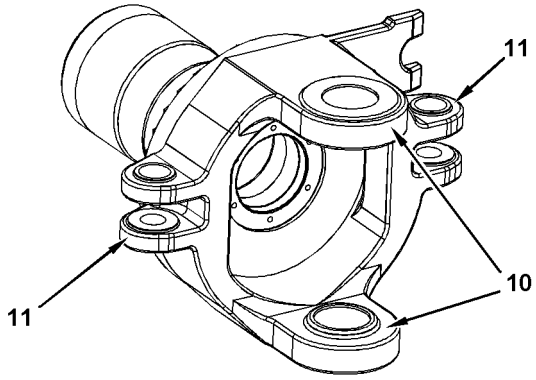

Illustration 162 g01024833

The entire oscillating hitch should be thoroughly inspected. Hitch pin lugs (10) and steering cylinder lugs (11) are particularly important, but all areas of the oscillating hitch must be checked.

Rear Frame

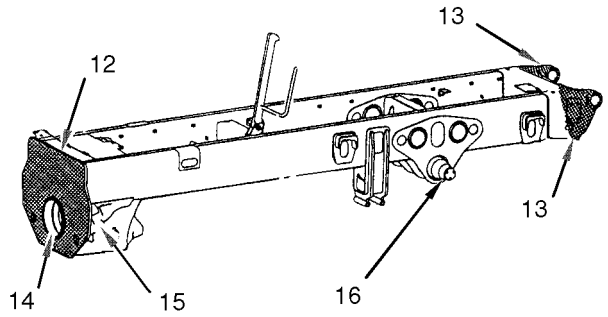

Illustration 163 g01024821

Inspect the following areas:

- Front plate (12)
- Mountings (13) for the body
- Oscillating hitch tube (14)
- Mounting brackets (15) for the hoist cylinders
- Spindles (16) for the equalizer arms

Rear Frames

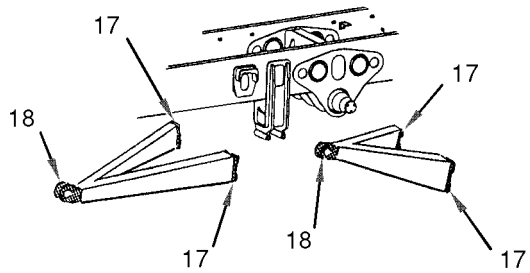

Illustration 164 g01024822

Inspect the following areas:

- Axle mountings (17)
- The pivots (18) for the A-frames

Dump Body

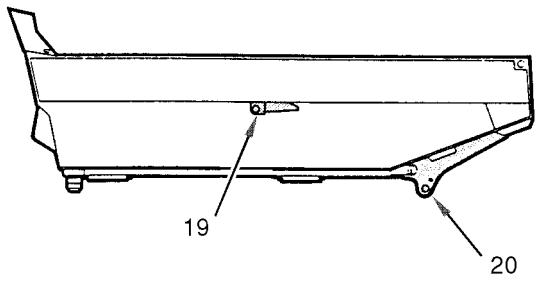

Illustration 165 g01024823

Inspect the following areas:

- The mounting brackets (19) for the hoist cylinders
- The mountings (20) for the dump body

Radiator Mounts

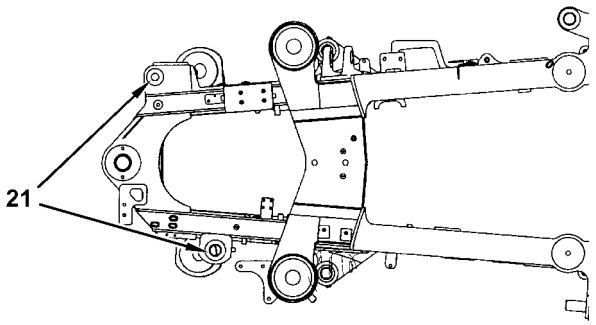

Illustration 166 g01134570

- Radiator Mountings (21)

Mounts for the Suspension

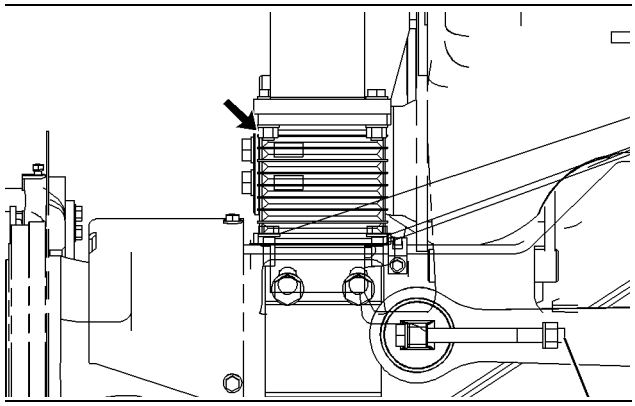

Illustration 167 g00954460

Check the mounts for cracks and for damage. If damage is visible, contact your Caterpillar dealer for more information.

Note: Inspect the mounts for the suspension after the initial 2000 service hours and every 250 service hours thereafter.

i03580264

Fuel System - Prime

SMCS Code: 1250-548

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. Clean up fuel spills immediately.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Prime the fuel system in order to fill the fuel filter with fuel. It is necessary to prime the fuel system after the fuel filters have been changed.

Park the machine on a level surface and engage the parking brake. Lower the truck body or OEM attachment and stop the engine.

Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

Type 1

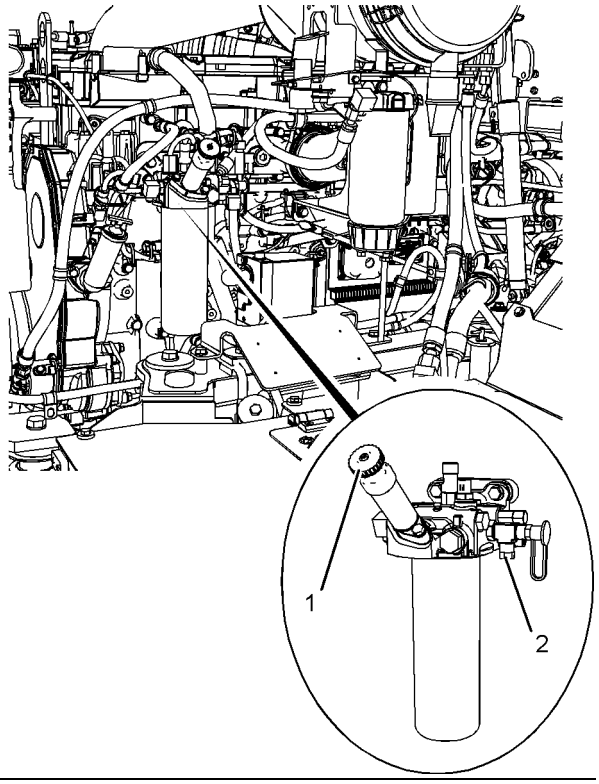

Illustration 168 g01435846

1. Open purge screw (2).
2. Turn the priming pump plunger (1) counterclockwise in order to unlock the plunger. Manually pump the plunger. This will fill the engine fuel lines and the fuel filters with fuel.
3. Operate the priming pump until the flow of fuel is free of air bubbles.
4. Close the purge screw.
5. Continue to operate the priming pump in order to build fuel pressure. This will create resistance in the plunger. Operate the priming pump until resistance is felt.

Note: Resistance will not be felt until the purge screw has been tightened.

6. Push in the plunger. Turn the plunger clockwise in order to lock the plunger.
7. Start the engine. If the engine starts but the engine runs rough, continue to run the engine at low idle until the engine runs smoothly. If the engine will not start after several attempts, consult your Caterpillar dealer.

Type 2

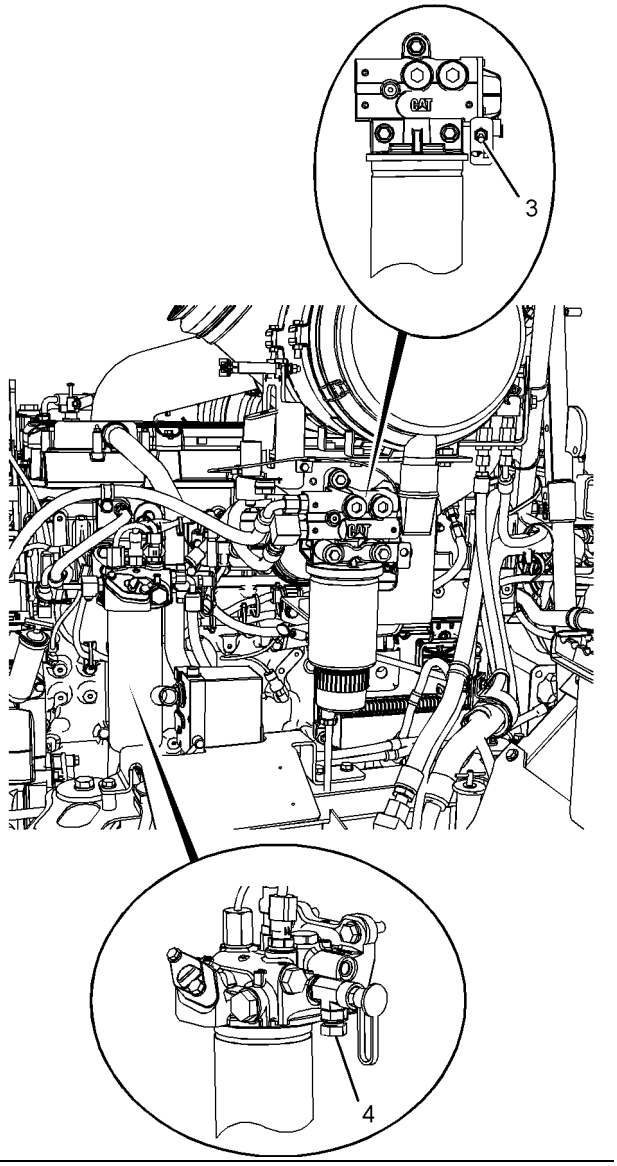

Illustration 169 g01435860

Note: The engine start switch must be in the OFF position in order to prime the fuel system.

1. Open purge screw (4).
2. Hold switch (3) upward in order to operate the electric fuel priming pump. This will fill the engine fuel lines and the fuel filters with fuel.
3. Operate the priming pump until the flow of fuel is free of air bubbles. Do not operate the pump for more than two minutes.
4. Close the purge screw.
5. Continue to operate the priming pump in order to build fuel pressure. As the fuel pressure increases, the priming pump will come under load. Listen for the priming pump to come under load. Do not continue priming the fuel system after the priming pump is under load. Do not operate the pump for more than two minutes.

Note: The priming pump will not come under load until the purge screw has been tightened.

6. Start the engine. If the engine starts but the engine runs rough, continue to run the engine at low idle until the engine runs smoothly. If the engine will not start after several attempts, consult your Caterpillar dealer.

i03580276

Fuel System Primary Filter - Clean/Inspect/Replace

SMCS Code: 1260-510; 1260-571

NOTICE
Do not fill fuel filter with fuel before installing the fuel filter. Contaminated fuel causes accelerated wear to fuel system parts.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and stop the engine.
2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.
3. Clean the outside of the primary fuel filter element.

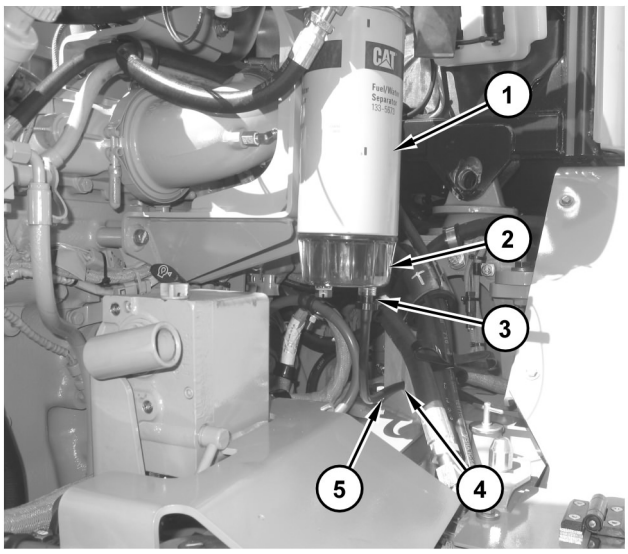

Illustration 170 g01296268

4. Insert drain hose (5) into a suitable container. Open valve (3) in order to drain the fuel from the filter. Close the valve.

5. Use a strap wrench to remove filter element (1) from the filter base assembly.

6. Detach bowl (2) from the filter element. Properly discard the used filter.

7. Clean the filter base assembly.

8. Coat the new seal with clean diesel fuel prior to installation.

9. Attach the bowlto the new filter element.

10. Install the new filter element by hand. When the seal contacts the filter base assembly, tighten the filter by 270 degrees more.

Note: The filter element has indicator marks at every 90 degrees.

11. Ensure that the drain hose is routed through hole (4).

12. Prime the fuel system.

    Refer to the Operation and Maintenance Manual, “Fuel System - Prime”.

13. Start the engine and check for leaks.

14. Close the hood.

i03580300

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

NOTICE
Do not fill the secondary fuel filter with fuel before installing. The fuel would not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Before you replace the secondary fuel filter, the primary fuel filter must be replaced. Refer to the Operation and Maintenance Manual, “Fuel System Primary Filter - Clean/Inspect/Replace”.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

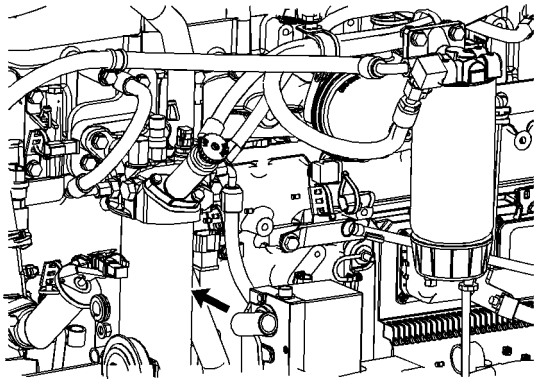

Illustration 171 g01127401

3. Use a strap wrench and remove the secondary fuel filter. Discard the secondary fuel filter properly.

4. Clean the fuel filter base.

5. Coat the seal for the new secondary fuel filter with clean diesel fuel prior to installation.

6. Install the new secondary fuel filter by hand. **Do not use a tool for installation of the secondary fuel filter.** When the new filter base gasket contacts the fuel filter base, tighten the secondary fuel filter by an additional 270°.

7. Prime the fuel system.

   Refer to the Operation and Maintenance Manual, “Fuel System - Prime”.

8. Start the engine and check for leaks.

9. Lower the hood.

i02589182

Fuel System Water Separator - Drain

SMCS Code: 1263-543

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

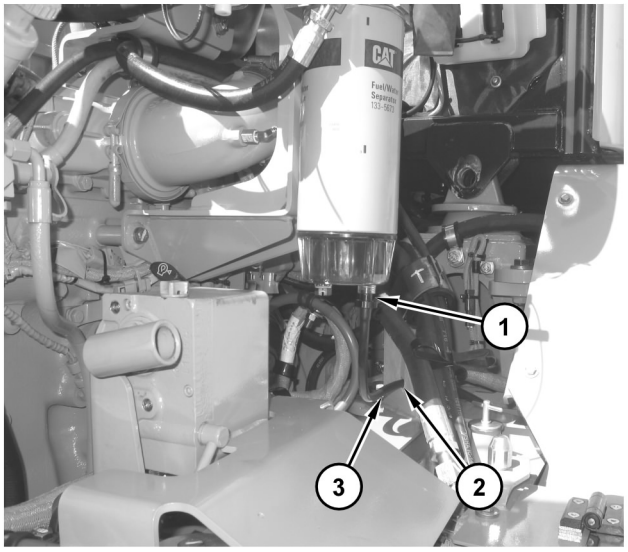

Illustration 172 g01296353

Note: The water separator is located below the primary fuel filter element.

2. Insert drain hose (3) into a suitable container and open valve (1). Close the valve.

3. Ensure that the drain hose is routed through hole (2).

4. Lower the hood.

i03580328

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR; 1273-070-Z2

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

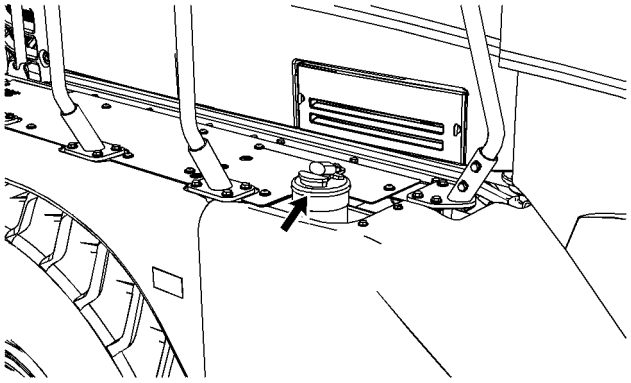

Illustration 173 g01127257

1. Remove the fuel tank cap.

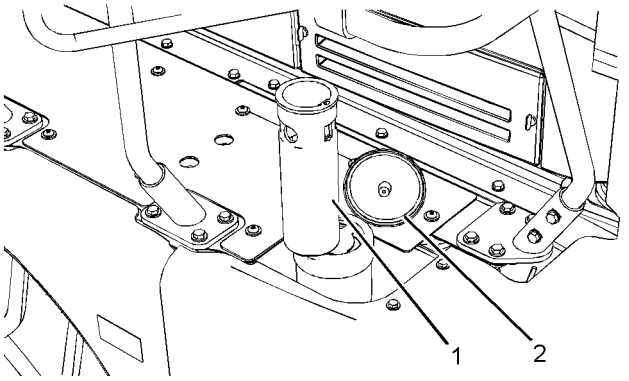

Illustration 174 g01127259

2. Remove fuel strainer (1).

3. Inspect O-ring seal (2) for damage. Replace the O-ring seal if the O-ring seal is damaged.

4. Clean the fuel strainer in clean, nonflammable solvent. If the fuel strainer is damaged, replace the fuel strainer.

5. Clean the fuel tank cap in nonflammable solvent. If the fuel tank cap is damaged, replace the fuel tank cap.

6. Allow the fuel strainer and the fuel tank cap to dry.

7. Reinstall the fuel strainer.

8. Reinstall the fuel tank cap.

i03581140

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE
Fill the fuel tank at the end of each day of operation to drive out moist air and to prevent condensation.

Do not fill the tank to the top. Fuel expands as it gets warm and may overflow.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

Drain water and sediment from the fuel tank after the fuel tank has been filled. Allow the machine to stand for ten minutes before draining the fuel tank.

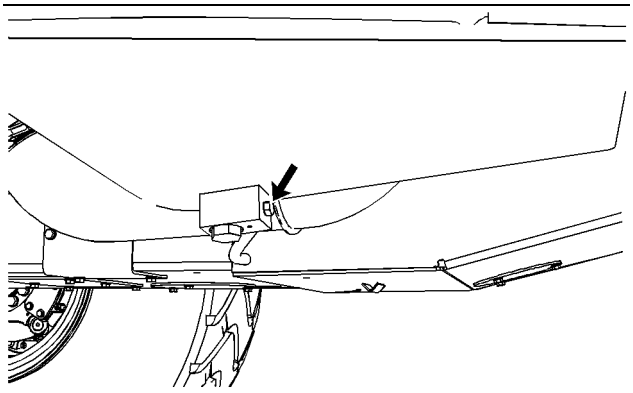

Illustration 175 g01125850

The purge screw for the fuel tank is located on the bottom of the fuel tank. The fuel tank is located on the right side of the tractor.

1. Remove the fuel tank cap.

The fuel tank cap is located on top of the fuel tank.

2. Open the purge screw until fluid and sediment starts to flow from the drain hole.

3. Allow the fluid and sediment to flow into a suitable container.

4. When the flow from the fuel tank is free of water and sediment, close the purge screw.

i02640955

Fuses - Replace

SMCS Code: 1417-510

NOTICE
Replace fuses with the same type and size only. Otherwise, electrical damage can result.

If it is necessary to replace fuses frequently, an electrical problem may exist. Contact your Caterpillar dealer.

The fuses protect the electrical system from damage, which can be caused by an electrical overload. If the wire within a particular fuse separates due to an electrical overload, the circuit will be broken. If the wire separates, replace the fuse.

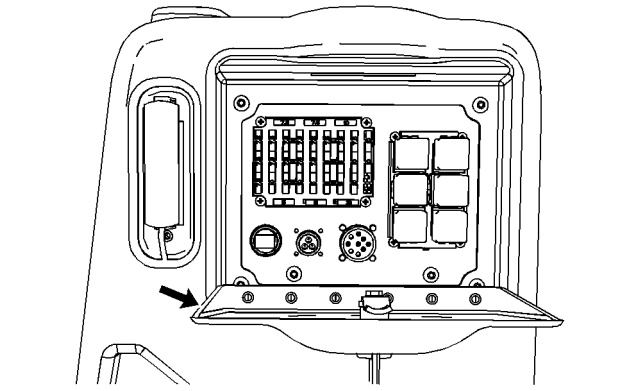

Illustration 176 g01188010

The fuse panel is located on the right side of the seat for the operator.

1. Open the door to the fuse panel in order to access the fuses.
2. Refer to the instructions on the inside of the door in order to select the appropriate fuse.
3. Replace the appropriate fuse.

Autolube System – 10 amp

Camera – 7.5 amp

Secondary Steering Switch – 7.5 amp

Differential Lock – 7.5 amp

Heated Mirror – 7.5 amp

Rear Work Lights – 7.5 amp

Hoist – 7.5 amp

Secondary Steering Relay – 7.5 amp

A4 Actual Gear Switch with Key in ON position – 7.5 amp

Seat – 10 amp

Voltage Converter – 10 amp

Front Wiper/Washer – 10 amp

Rear Wiper/Washer – 10 amp

Dome Light – 7.5 amp

Horn – 10 amp

Backup Alarm – 7.5 amp

Engine Start Switch – 7.5 amp

Caterpillar Monitoring System – 7.5 amp

Climate Control – 15 amp

Transmission Control – 15 amp

Headlights – 15 amp

Engine Control – 15 amp

Cigar Lighter – 10 amp

Product Link – 10 amp

Directional Control Signals – 10 amp

Stop Lights – 10 amp

i03581180

Hoist Cylinder Bearings - Lubricate

SMCS Code: 5102-086-BD

Note: The OEM Articulated Truck may be equipped with either a truck body or a OEM attachment. The operation of the OEM attachment is very similar to the operation of the truck body.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Raise the truck body or OEM attachment and install the truck body prop or OEM attachment prop in order to ensure proper lubrication.

Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

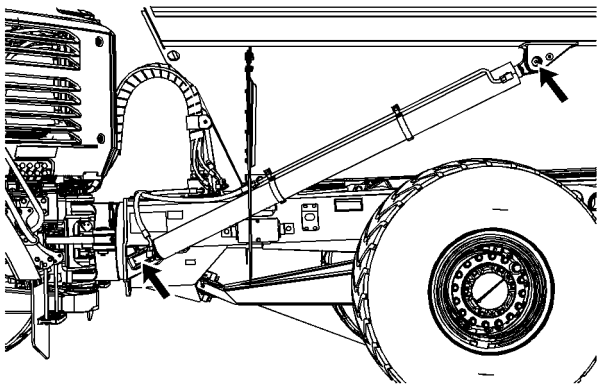

Illustration 177 g01126413

Two grease fittings are located on each hoist cylinder. One fitting is located at the top of each hoist cylinder. One fitting is located at the bottom of each hoist cylinder.

1. Remove the plastic caps from the grease fittings. Wipe all grease fittings before you lubricate the hoist cylinder bearings.
2. Lubricate the hoist cylinder bearings via the four grease fittings.

   If regular lubrication is performed at the recommended interval, only one or two shots of grease will be required at each grease fitting.
3. Install the plastic caps.

i03581190

Hydraulic System Oil - Change

SMCS Code: 5050-044; 5056-044; 5095-044

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

Before you change the oil, block the front frame of the machine.

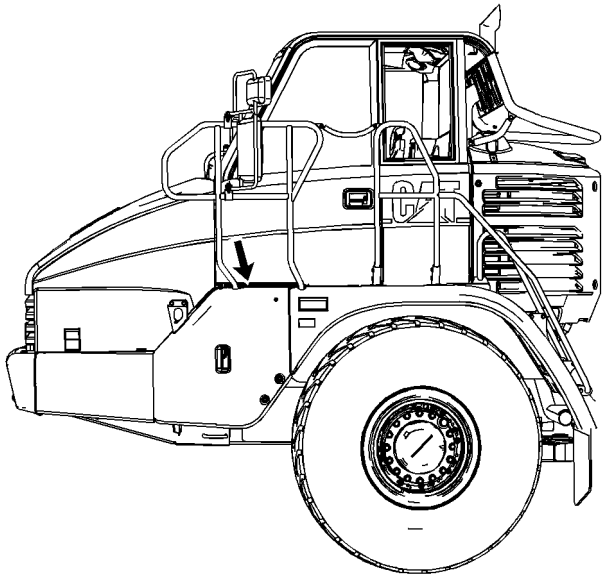

Illustration 178 g01133381

1. Lift the panel that covers the hydraulic tank.

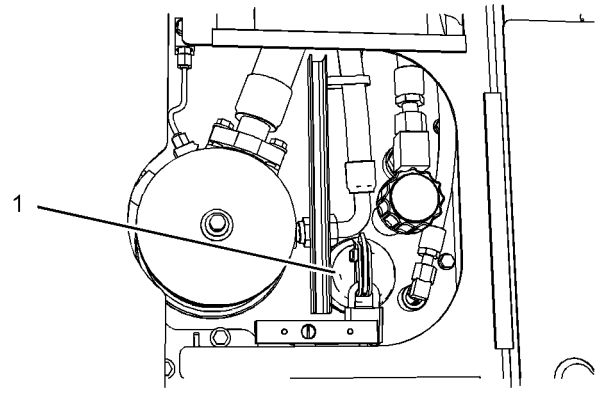

Illustration 179 g01127242

2. Remove filler cap (1). Remove the filler cap slowly in order to gradually relieve any system pressure.

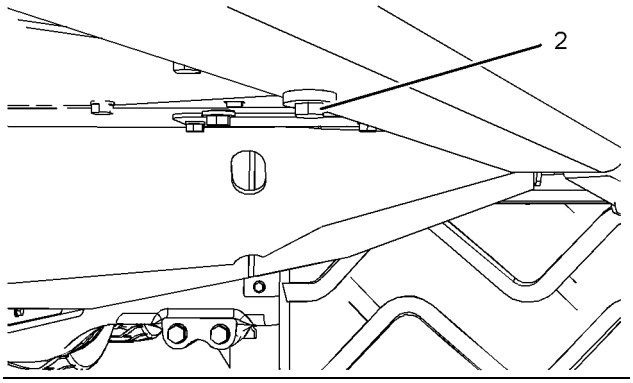

Illustration 180 g01127252

3. Drain plug (2) is located beneath the tank.

Remove the drain plug. Install 6B-3156 Pipe Nipple in order to unseat the drain valve. Allow the oil to drain into a suitable container.

4. Remove the pipe nipple. Inspect the drain plug and the seal for damage. If the drain plug or the seal are damaged, replace the damaged components.

Install the drain plug and the seal.

5. Fill the tank with new oil through the filler tube.

Refer to Operation and Maintenance Manual, “Lubricant Viscocities” and Operation and Maintenance Manual, “Capacities (Refill)”.

6. Start the engine and run the engine at low idle.

7. Check that there is adequate vertical clearance.

8. Raise the truck body or OEM attachment and lower the truck body or OEM attachment.

9. Check that there is adequate sideways clearance. Steer the machine fully to the left and steer the machine fully to the right.

10. Check the oil level. Add oil, if necessary.

Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”.

11. Check the filler cap and the seal for damage. Replace any damaged components. Install the filler cap.

12. Clean up oil spills.

i02228175

Hydraulic System Oil Filter and Screen - Clean/Inspect/Replace

SMCS Code: 5056-070-Z3; 5056-510-Z3; 5068-510

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

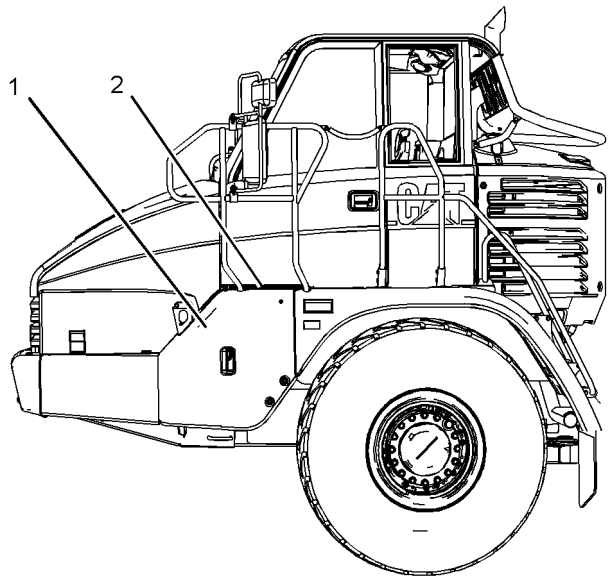

Illustration 181 g01133448

The oil filter elements and the screen are located inside tank (1). Lift panel (2) in order to access these components. Reposition the panel once these components have been serviced.

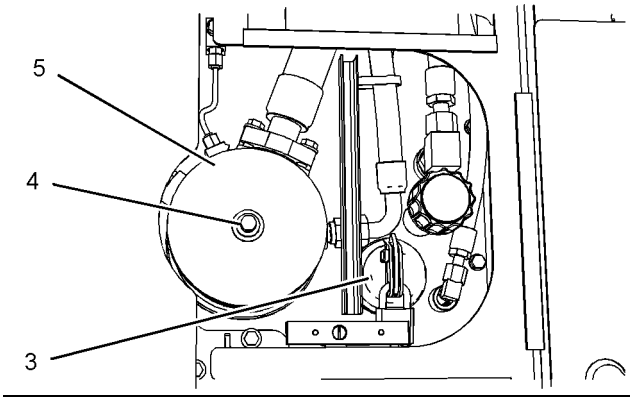

Illustration 182 g01127691

1. Remove filler cap (3). Remove the filler cap slowly in order to gradually relieve any system pressure.

2. Unscrew bolt (4) and lift cover (5). The screen assembly is fastened to the cover.

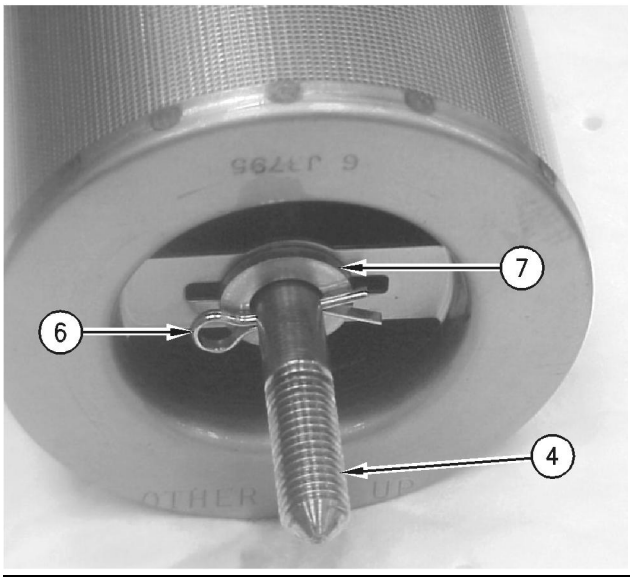

Illustration 183 g00686996

3. Remove cotter pin (6) and washer (7) from bolt (4). This will allow the removal of the filter elements from the inside of the screen.

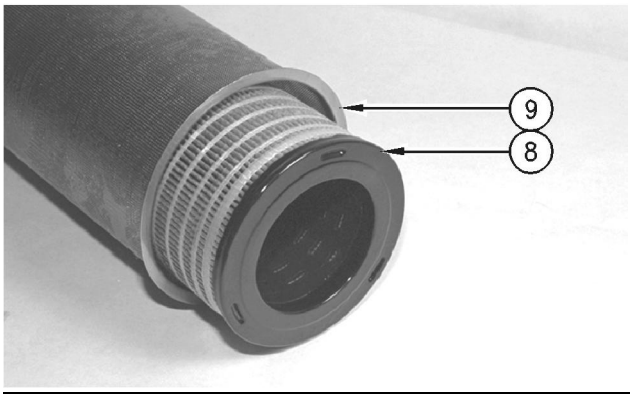

Illustration 184 g00686999

4. There are two filter elements (8) within screen (9). Remove both elements and discard both filter elements.

5. Wash the screen in clean nonflammable solvent. Inspect the screen for damage. If necessary, replace the screen. Allow the screen to dry.

6. Install two new filter elements into the clean screen.

7. Install cotter pin (6) and washer (7) on bolt (4).

8. Install bolt (4) and cover (5).

9. Replace filler cap (3).

i02207745

Hydraulic System Oil Level - Check

SMCS Code: 5050-535-FLV; 5056-535-FLV; 5095-535-FLV

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged.

2. Shut off the engine and allow the level of the oil to stabilize.

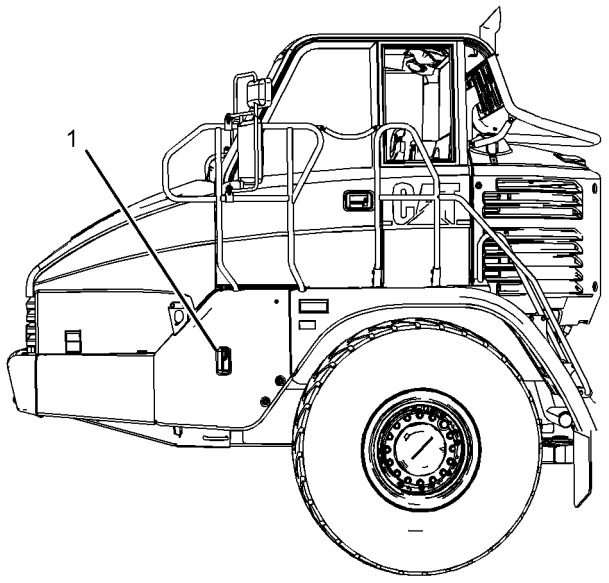

Illustration 185 g01133455

3. Check the oil level on sight glass (1). The sight glass is located within panel (2) on the left side of the machine.

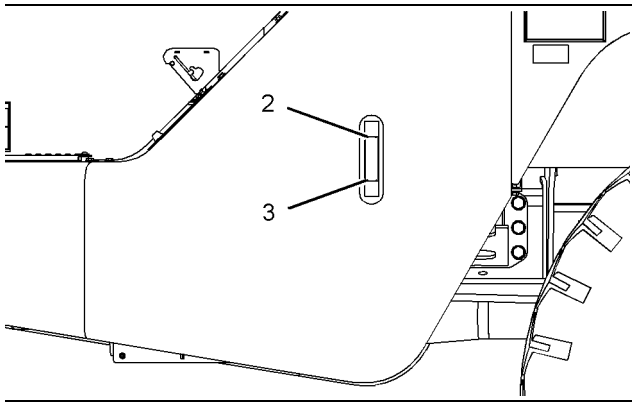

Illustration 186 g01127255

4. The oil must be at the highest level (2) when the oil is at operating temperature. When the oil is cold the oil must be halfway between the highest level and the lowest level (3) on the sight glass. Maintain the oil at these levels.

   If necessary, add oil through the oil filler tube.

   Refer to Operation and Maintenance Manual, “Hydraulic System Oil - Change” and Operation and Maintenance Manual, “Lubricant Viscocities”.

i03581200

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008; 7542-008

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

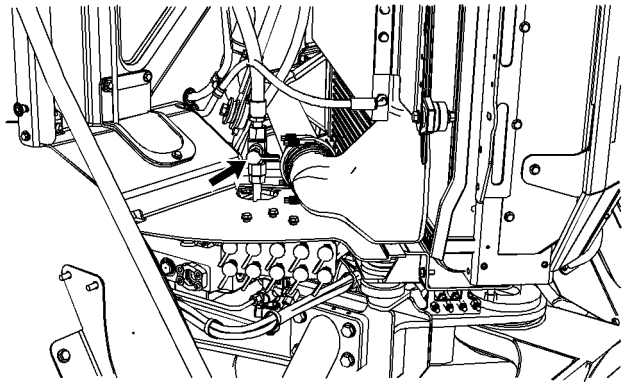

Illustration 187 g01127254

The sampling valve for the hydraulic system oil is located on the left side of the machine behind the cab.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of oil. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of oil.

i02235389

Hydraulic Tank Breather - Clean/Inspect/Replace

SMCS Code: 5056-040-BRE; 5056-070-BRE; 5056-510-BRE

The tank is located on the left side of the tractor.

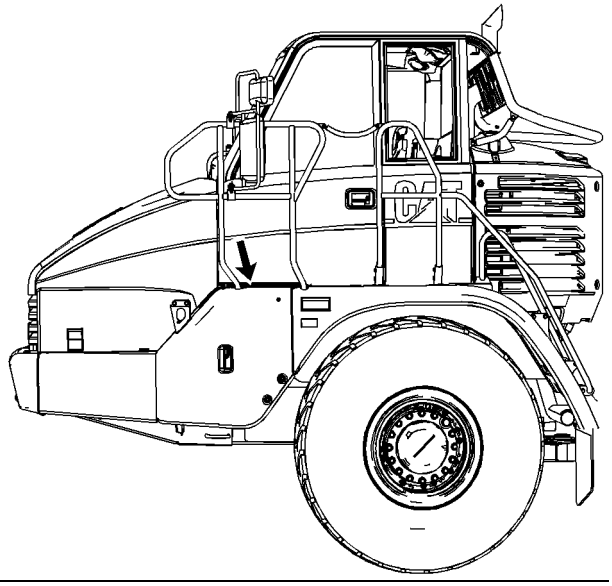

Illustration 188 g01133381

1. Lift the panel that covers the hydraulic tank.

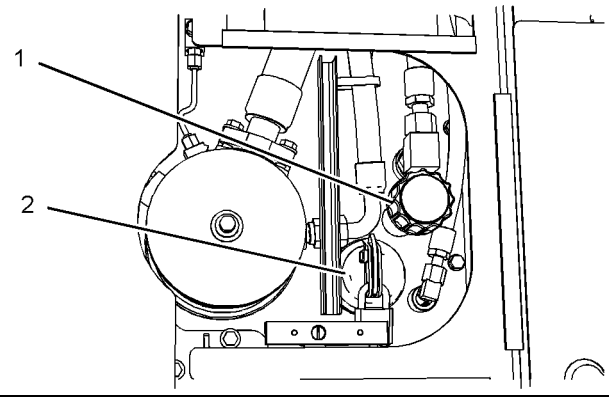

Illustration 189 g01127233

2. Remove filler cap (2). Remove the filler cap slowly in order to gradually relieve any system pressure.
3. Unscrew breather (1). Remove the breather from the machine.
4. Clean the breather in nonflammable solvent. Shake the breather until the breather is dry.
5. Inspect the breather for damage. If the breather is damaged, replace the breather.
6. Install the clean breather.
7. Install the filler cap and close cover (1).

i03581220

Hydraulic Tank Strainer - Clean/Inspect/Replace

SMCS Code: 5056-040-STR; 5056-070-STR; 5056-510-STR

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

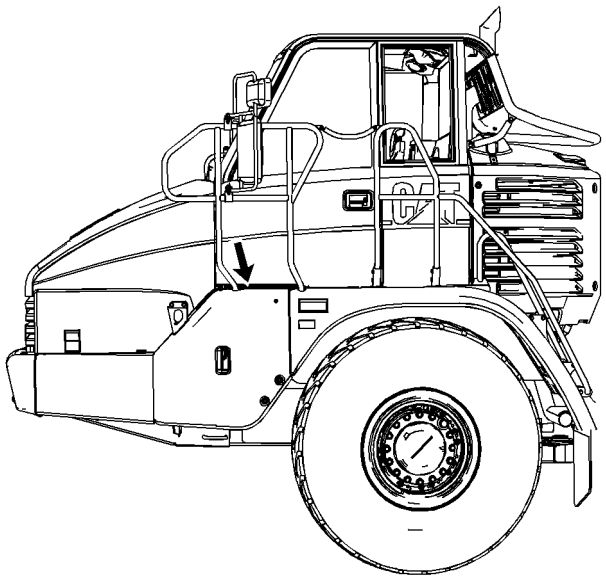

Illustration 190 g01133381

The strainer is located inside the filler tube for the tank. The filler tube is located on top of the tank on the left side of the machine. Lift the panelthat covers the hydraulic tank in order to access the filler tube. Reposition this panel once the strainer has been cleaned.

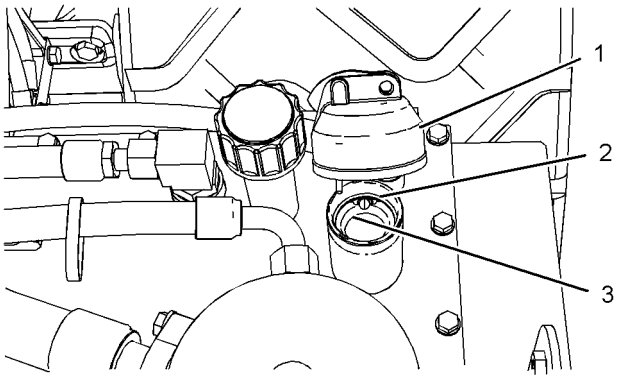

Illustration 191 g01127485

1. Remove filler cap (1).
2. Remove retaining ring (2) and remove strainer (3) from the hydraulic filler tube.
3. Wash the strainer in nonflammable solvent. Allow the strainer to dry before the strainer is reinstalled.

   If the strainer is damaged, replace the strainer.
4. Inspect the filler cap and the gasket which is inside of the filler cap. Replace any damaged components.
5. Install the strainer and the retaining ring.
6. Install the filler cap.

i02243702

Oscillating Hitch - Adjust

SMCS Code: 7113-025

1. Relieve the tension from the oscillating hitch. Place a large block of timber behind the rear wheels of the machine and reverse the machine against the block.
2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

Adjusting Hitch Pin Clearance

1. To relieve the downward force, position a hydraulic jack under the tractor portion of the hitch and slightly raise the hitch.

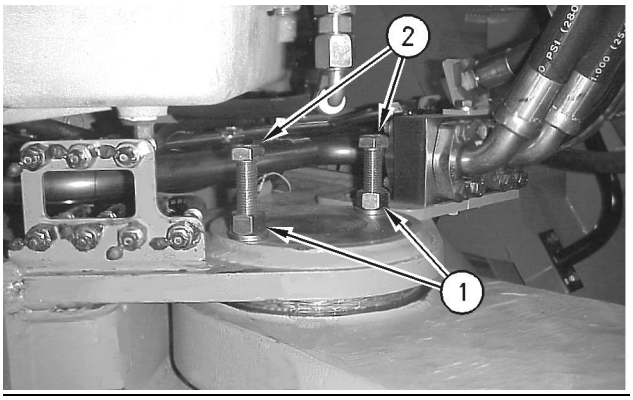

Illustration 192 g00738671

2. Loosen jam nuts (1). Turn adjusting screws (2) clockwise onto the top of the thrust ring. Turn the adjustment screws evenly in order to take up excessive clearance. **Do not overtighten the screws.**

3. Tighten jam nuts (1).

Adjusting the Thrust Plate

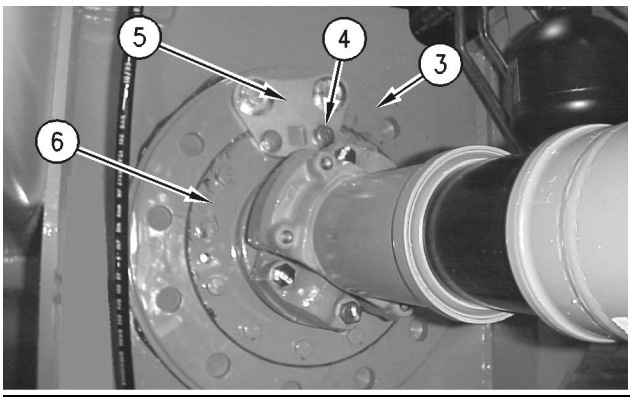

Illustration 193 g00738672

1. Remove two bolts (4) and remove locking plate (5).

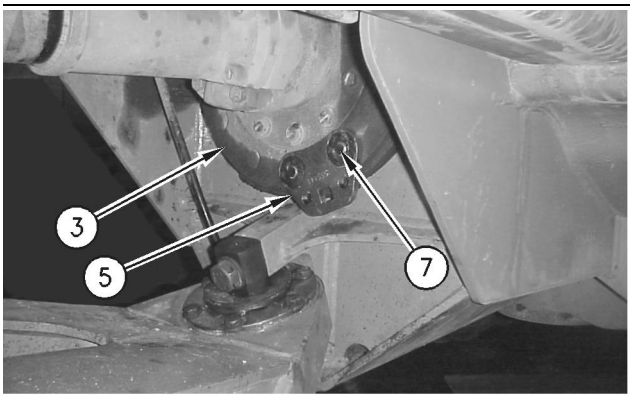

Illustration 194 g00742918

2. Reposition locking plate (5) against thrust flange (3). Engage both dowels (7) into two of the holes in thrust flange (3).

3. Insert a 3/4 inch square drive through the hole in locking plate (5). The square drive will prevent locking plate (5) from rotating clockwise.

4. Use a suitable wrench on the square drive in order to turn thrust flange (5) clockwise until all end play has been removed.

5. If necessary, turn the thrust flange counterclockwise in order to line up the holes. Insert the square drive into the hole on locking plate (5) in order to rotate the thrust flange counterclockwise. Rotate the thrust flange as far as the first correct hole alignment.

6. Remove the square drive and reposition locking plate (5) and bolts (4).

7. Remove the hydraulic jack.

8. Remove the steering frame lock.

i03581242

Oscillating Hitch - Lubricate

SMCS Code: 7113-086

NOTICE
Check that lines attached to remote grease fittings are undamaged. If the lines are split grease will not reach the bearings or pins. Machine damage will result.

The hitch bearings must be lubricated regularly. Rapid wear will result from inadequate lubrication.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and stop the engine.

If regular lubrication is carried out at the recommended interval, the fittings for the oscillating hitch pins should only take one or two shots of grease. As many as twenty shots of grease may be used in order to lubricate the bearings for the oscillating hitch.

1. Install the steering frame locks. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

2. Before you lubricate the fittings, wipe the fittings in order to clean the fittings.

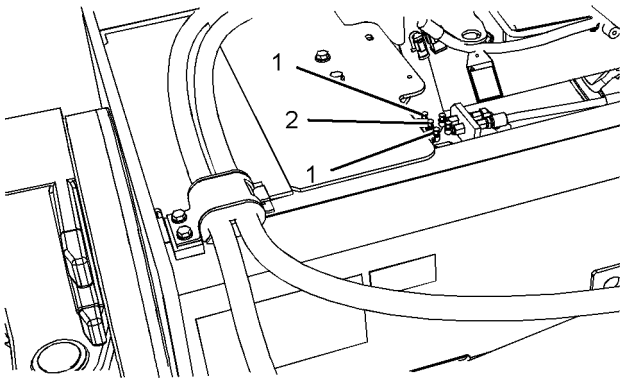

Illustration 195 g01125855

3. Lubricate the hitch bearings through fittings (1). Fitting (2) is initially used to fill the cavity between the two hitch bearings. This fitting does not require regular lubrication.

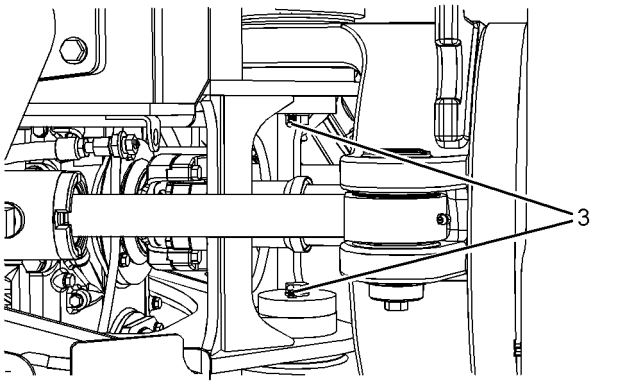

Illustration 196 g01125856

4. Lubricate the hitch pins through two fittings (3).

5. Remove the steering frame locks.

i02206939

Radiator Core - Clean

SMCS Code: 1353-070-KO

⚠ WARNING

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.

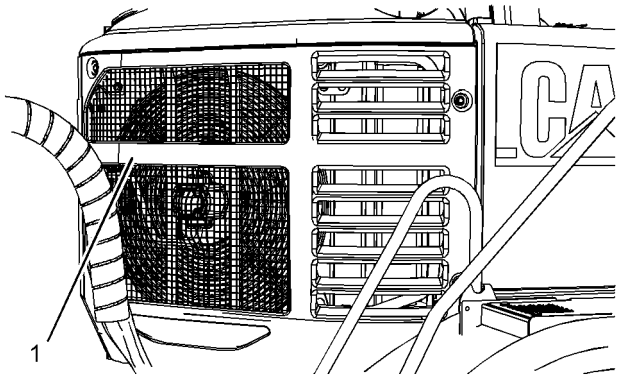

Illustration 197 g01125452

To access the radiator, cover (1) needs to be removed. The cover is held in place by four bolts .

You can use compressed air, high pressure water or steam to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

Refer to Special Publication, SEBD0518, “Know Your Cooling System” for the complete procedure for cleaning the radiator core.

i03581262

Refrigerant Dryer - Replace

SMCS Code: 7322-510

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

Park the machine on a level surface. Engage the parking brake. Lower the truck body or OEM attachment and shut off the engine.

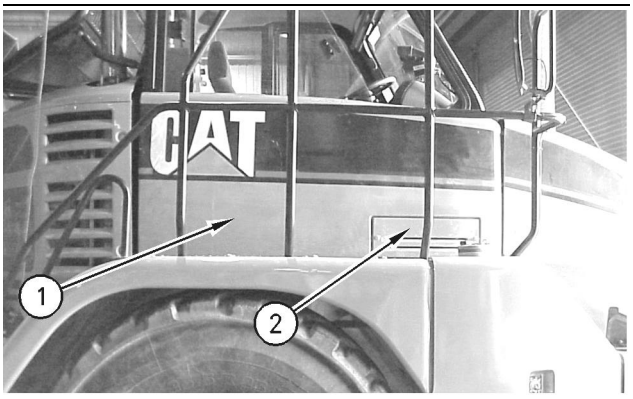

Illustration 198 g00737759

The in-line refrigerant dryer is located behind panel (1) on the right side of the cab.

Remove the panel in order to gain access to the in-line refrigerant dryer. The panel is held in place by seven bolts and washers, which should be retained.

Note: One of the bolts is located under cover (2).

Refer to Service Manual, SENR5664, “In-Line Refrigerant Dryer - Remove and Install” for the replacement procedure of the in-line refrigerant dryer.

Note: When you operate the machine in a climate with high humidity, replace the in-line refrigerant dryer after every 1000 service hours or 6 months.

i03581280

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

NOTICE
Do not attempt to straighten the ROPS structure. Do not repair the ROPS by welding reinforcement plates to the structure.

If there are any cracks in the welds, in the castings, or in any metal section of the ROPS, consult your Caterpillar dealer for repairs.

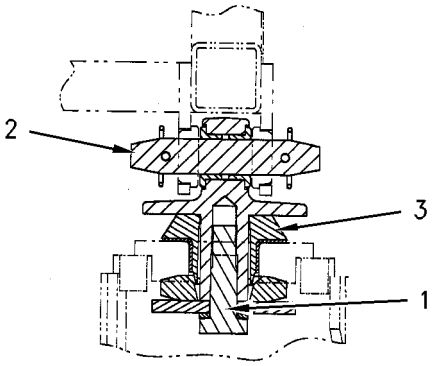

Illustration 199 g00738669

The ROPS is held in position by four mounting bolts (1), four pins (2) and four rubber mounts (3). One mounting bolt, one pin and one rubber mount is located on each corner of the ROPS.

Carry out the following steps in order to inspect the ROPS:

1. Park the machine on a level surface. Engage the parking brake. Lower the truck body or OEM attachment and shut off the engine.

2. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

3. Raise the hood in order to access the front ROPS mountings. Refer to Operation and Maintenance Manual, “Hood Control”.

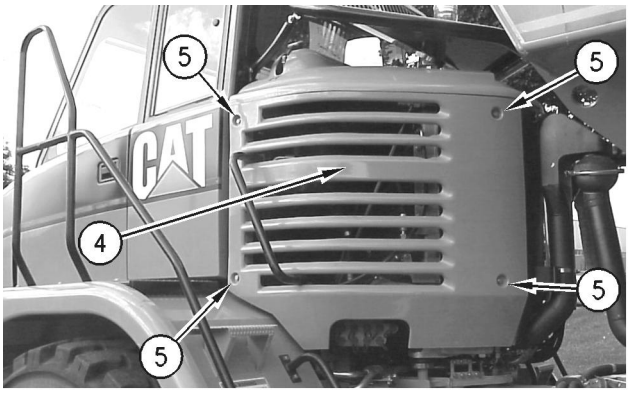

Illustration 200 g00738305

4. Remove cover (4) at the left side rear of the cab by removing four bolts (5) and retaining the four bolts. This will enable access to inspect the left side rear mounting.

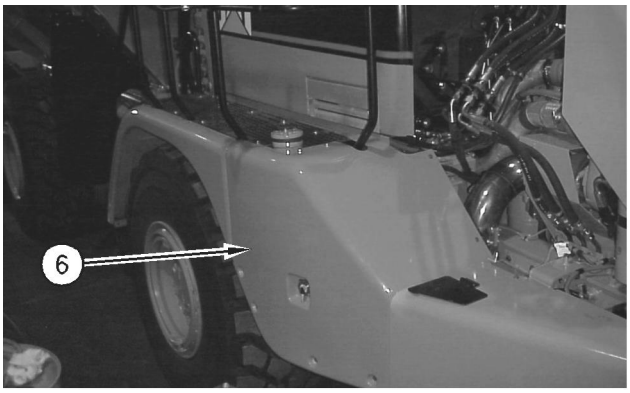

Illustration 201 g00738528

5. Remove tank cover (6) on the fuel tank and retain the bolts. This will enable removal of fender panel (10) later.

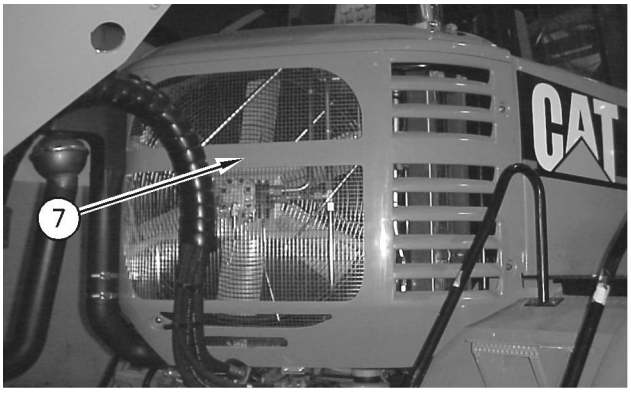

Illustration 202 g00738535

6. Remove cover (7) that covers the radiator on the right side of the machine and retain the bolts. This will enable removal of panel (8) later.

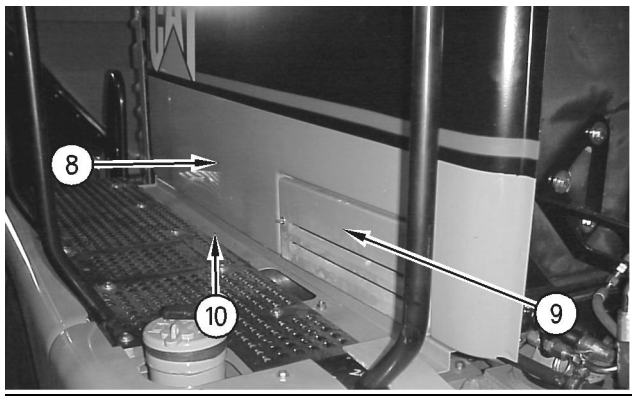

Illustration 203 g00738540

7. Remove panel (8) on the right side of the cab and retain the bolts.

Note: One of the bolts is located under cover (9).

Remove fender panel (10) and retain the bolts.

8. Inspect the following items: mounting bolts (1), pins (2), and rubber mounts (3). Replace any damaged pins, bolts or rubber mounts with original equipment parts.

9. Inspect the ROPS for bolts that are loose or damaged. Bolts that are loose, damaged or missing should be replaced by original equipment parts only.

10. Tighten mounting bolts (1) to a torque of 900 ± 100 N·m (664 ± 74 lb ft).

11. Use the bolts that were retained earlier in order to secure the covers and panels. Secure the covers and panels in the following order: fender panel (10), panel (8), cover (9), cover (7), tank cover (6), and cover (4).

12. Close the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

13. Remove the steering frame lock. Refer to Operation and Maintenance Manual , “Steering Frame Lock”.

i02429589

Seat Belt - Inspect

SMCS Code: 7327-040

Always check the condition of the seat belt and the condition of the seat belt mounting hardware before you operate the machine. Replace any parts that are damaged or worn before you operate the machine.

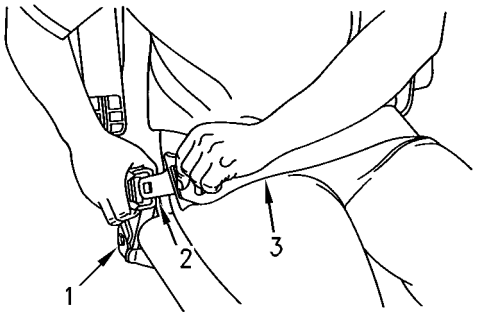

Illustration 204 g00932801

Typical example

Check the seat belt mounting hardware (1) for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

Check buckle (2) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect the seat belt (3) for webbing that is worn or frayed. Replace the seat belt if the seat belt is worn or frayed.

Consult your Caterpillar dealer for the replacement of the seat belt and the mounting hardware.

Note: Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to the seat belt, the seat belt buckle, and the seat belt retractor.

If your machine is equipped with a seat belt extension, also perform this inspection procedure for the seat belt extension.

i02429594

Seat Belt - Replace

SMCS Code: 7327-510

Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt . Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to the seat belt, the seat belt buckle, and the seat belt retractor.

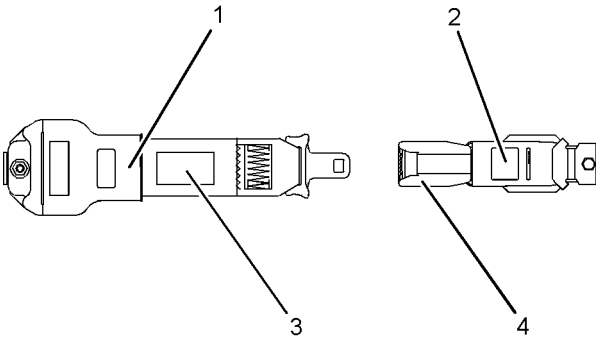

Illustration 205 g01152685

(1) Date of installation (retractor)
(2) Date of installation (buckle)
(3) Date of manufacture (tag) (fully extended web)
(4) Date of manufacture (underside) (buckle)

Consult your Caterpillar dealer for the replacement of the seat belt and the mounting hardware.

If your machine is equipped with a seat belt extension, also perform this replacement procedure for the seat belt extension.

i03581320

Secondary Steering - Test

SMCS Code: 4324-081

Test the secondary steering by using the following procedure:

1. Park the machine on a hard level surface. Lower the truck body or OEM attachment and shut off the engine. Leave the engine start switch in the ON position.

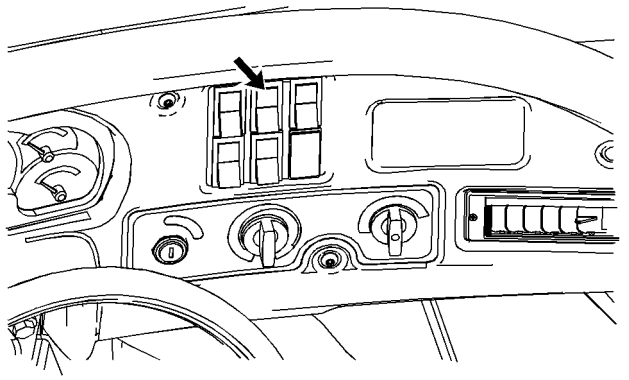

Illustration 206 g01035886

2. Press and hold the top of the test switch for the secondary steering. This will activate the secondary steering motor.

3. Turn the steering wheel fully from left to right. If the machine responds to the steering input the secondary steering is operating. If the machine does not respond to the steering input the secondary steering is not working.

4. Release the test switch for the secondary steering. Spring force will return the test switch for the secondary steering to the OFF position. This will deactivate the secondary steering motor. Do not run the secondary steering motor longer than 12 seconds while you are testing the secondary steering.

   Do not operate the machine if the secondary steering is not operating correctly.

i03581322

Steering Cylinder Bearings - Lubricate

SMCS Code: 4303-086-BD

NOTICE
Check that the lines attached to all the remote grease fittings are undamaged. If the grease lines are split, grease will not reach the components that require lubricating. Machine damage will result.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and stop the engine. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

If regular lubrication is carried out at the recommended intervals, only one or two shots of grease will be required at each fitting. If more than two shots of grease per fitting are required, the lines may be split or damaged, and grease will not reach the steering cylinder pins.

1. Remove the plastic caps and clean the fittings before you apply grease. Reinstall the plastic caps once grease has been applied.

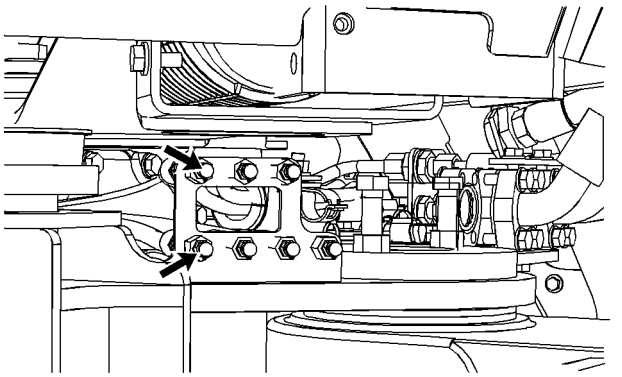

Illustration 207 g01126471

2. Lubricate the front steering cylinder bearings through the fittings on the panel.

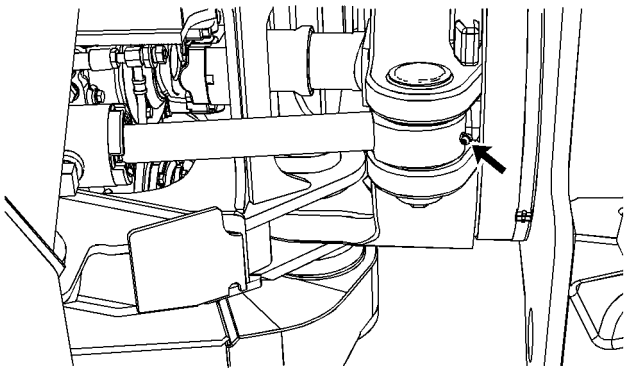

Illustration 208 g01126474

3. Lubricate the rear steering cylinder bearings through fittings on the cylinders.

4. Remove the steering frame locks.

i02021470

Suspension System - Check

SMCS Code: 7200-535

⚠ WARNING

The suspension system may drop the machine suddenly leaving no clearance between the axle housing, main frame, tires, and mud guards.

Working in these areas can result in personal injury or death by crushing.

Park the machine on level ground and block the front frame before you go under the machine.

1. Disengage the differential locks. Bring the machine to a gentle stop on firm level ground.
2. Release the service brake. Wait for one second before applying the parking brake.
3. Install suitable stands under the front frame.

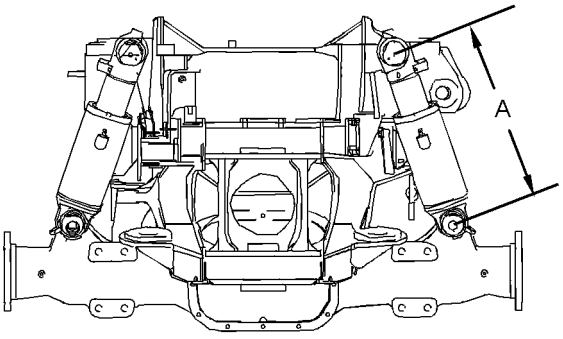

Illustration 209 g01043895

4. Measure distance (A). Distance (A) is the distance between the mounting pins of the suspension cylinder. Dimension (A) should be 700 ± 10 mm (27.6 ± 0.39 inch).

Note: Measure distance (A) when the machine is cool.

5. If the suspension height is not correct, consult your Caterpillar dealer. Special tools and procedures are required in order to adjust the height of the front suspension.
6. Remove the stands.

i03581325

Suspension and Suspension Cylinder Bearings - Lubricate

SMCS Code: 7200-086-BD; 7201-086-BD

NOTICE
Check that the lines attached to all the remote grease fittings are undamaged. If the grease lines are split, grease will not reach the components that require lubricating. Machine damage will result.

Park the machine on a level surface. Engage the parking brake. Lower the truck body or OEM attachment and shut off the engine. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

If regular lubrication is performed at the recommended intervals, only one or two shots of grease will be required at each fitting.

1. Clean all the fittings by wiping before you lubricate the fittings.

Note: The fittings are located behind caps which require removing in order to access the fittings.

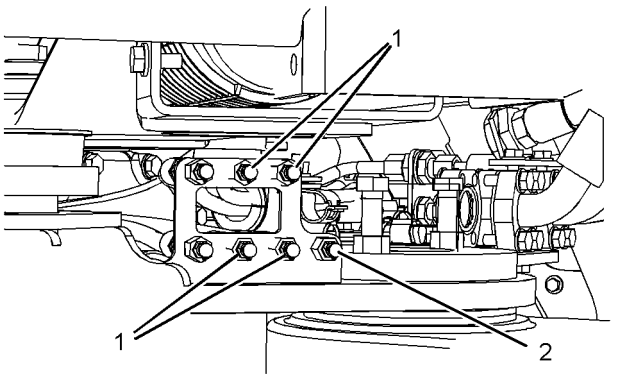

Illustration 210 g01126573

2. Lubricate the front suspension cylinder bearings through fittings (1). Lubricate the spherical bearing on the front suspension a-frame through fitting (2).

Note: The fittings for lubrication of the front suspension are located at the rear of the tractor on the left side.

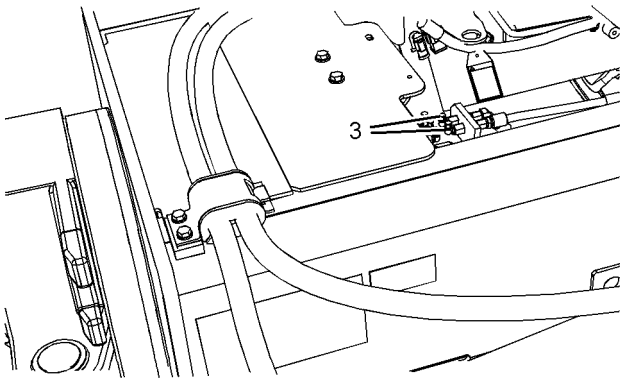

Illustration 211 g01126574

3. Lubricate the spherical bearings on the rear suspension a-frames through fittings (3).

Note: The fittings for lubrication of the spherical bearings on the rear suspension a-frames are located at the front of the trailer on the left side.

4. Install the caps to the fittings.

5. Remove the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

i00062438

Tire Inflation - Check

SMCS Code: 4203-535-AI

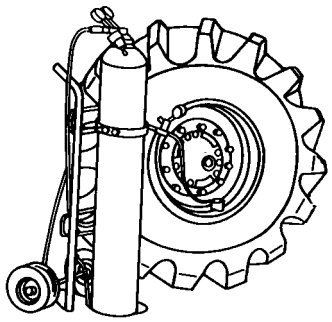

Illustration 212 g00103147

Measure the air pressure on each tire. Consult your Caterpillar dealer for the correct load rating and for the correct operating pressures.

If necessary, inflate the tires. Refer to the following additional information about tire inflation:

- Operation and Maintenance Manual, “Tire Inflation with Nitrogen”
- Operation and Maintenance Manual, “Tire Shipping Pressure”
- Operation and Maintenance Manual, “Tire Inflation Pressure Adjustment”

i03581346

Torque Converter and Transmission Oil - Change

SMCS Code: 3030-044-OC; 3101-044-OC

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

Operate the machine until the torque converter and transmission oil is warm. Park the machine on a level surface. Engage the parking brake. Lower the truck body or OEM attachment and shut off the engine.

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

The oil level dipstick is integral with the oil filler cap for the torque converter and transmission oil. The oil filler cap is located near the air cleaner housing.

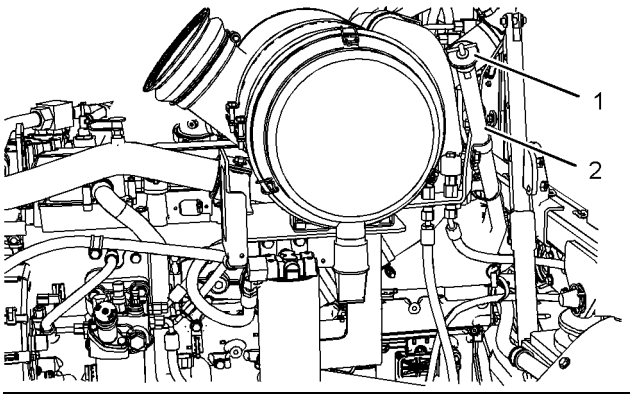

Illustration 213 g01126900

2. Clean the area around filler cap (1) and filler tube (2). Turn the handle on the dipstick in order to remove the dipstick. Remove the dipstick in order to allow the oil to drain.

Note: Before you change the oil, block the front frame of the machine.

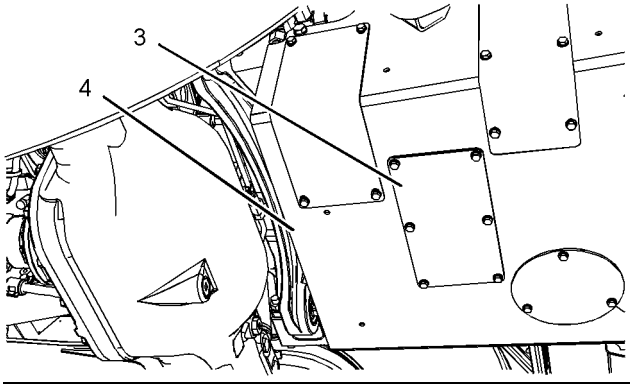

Illustration 214 g01127725

3. Remove plate (3) in order to access the drain plug for the torque converter and transmission oil.

Note: Plate (3) is located on the right side of transmission guard (4) in front of the front axle.

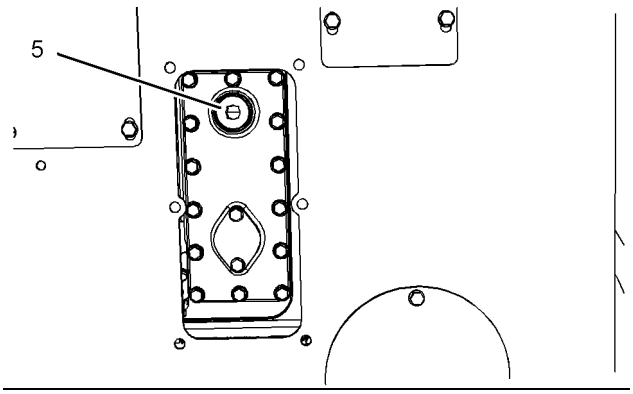

Illustration 215 g01127726

4. Clean the area around drain plug (5).

5. Remove the drain plug and the O-ring seal and retain the drain plug and the O-ring seal. Allow the oil to drain into a suitable container.

6. Inspect the O-ring seal for the drain plug. If necessary, replace the O-ring seal. Lubricate the O-ring seal with transmission oil. Install the O-ring seal and the drain plug.

7. Remove the oil filter for the torque converter and transmission oil. Discard the oil filter. Install a new oil filter. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Filter - Replace”.

8. Fill the transmission with new oil through filler tube (2). Fill the transmission to the “COLD SAFE START” range on the oil level dipstick. Refer to the Operation and Maintenance Manual, “Capacities (Refill)”, Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check”.

9. Guide the dipstick down the filler tube and turn the handle on the dipstick in order to make the seal between the filler tube and the filler cap.

10. Start the engine. Run the engine at low idle. Inspect the transmission for leaks.

11. Ensure that the parking brake is engaged. Engage the service brakes. Slowly operate the transmission control in order to circulate the oil.

12. Shut off the engine.

13. Replace Plate (3).

14. Wait for five minutes before removing dipstick (1). Turn the handle on the dipstick in order to remove the dipstick.

15. Clean the dipstick by wiping.

16. Install the dipstick fully.

17. Check the oil level on the COLD SAFE START side of the dipstick. The engine can be started if the oil is anywhere within the shaded area. If necessary, add oil.

18. Lower the hood.

19. Start the engine. Operate the machine until the temperature of the oil is at normal operating temperature.

20. Raise the hood.

21. Check the torque converter and transmission oil level on the “FULL HOT LOW IDLE” side of the dipstick. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check”. If necessary, add oil.

22. Shut off the engine.

23. Close the hood.

Ecology Drain

1. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

The oil level dipstick is integral with the oil filler cap for the torque converter and transmission oil. The oil filler cap is located near the air cleaner housing.

2. Clean the area around filler cap (1) and filler tube (2). Turn the handle on the dipstick in order to remove the dipstick. Remove the dipstick in order to allow the oil to drain.

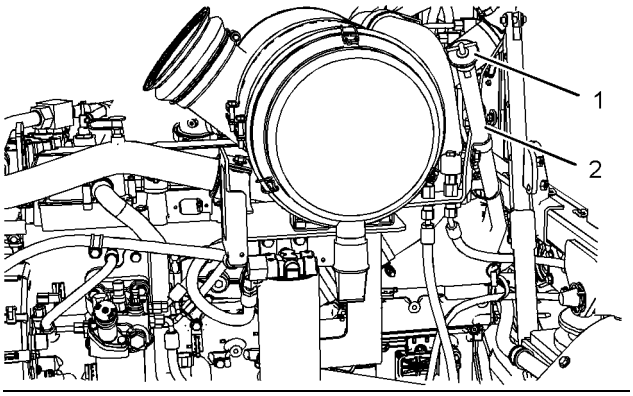

Illustration 216 g01126900

3. Clean the area around filler cap (1) and filler tube (2). Turn the handle on the dipstick in order to remove the dipstick. Remove the dipstick in order to allow the oil to drain.

Note: Before you change the oil, block the front frame of the machine.

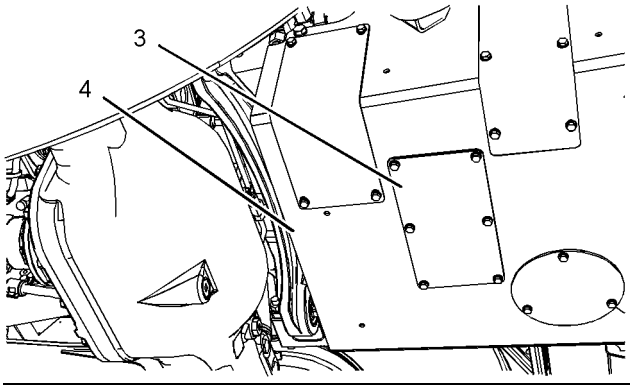

Illustration 217 g01127725

4. Remove plate (3) in order to access the drain plug for the torque converter and transmission oil.

Note: Plate (3) is located on the right side of transmission guard (4) in front of the front axle.

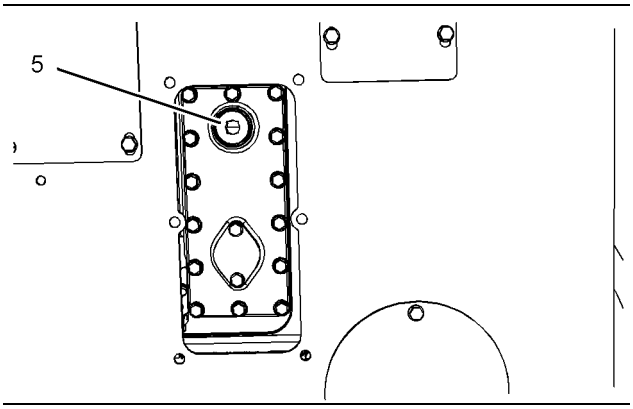

Illustration 218 g01127726

5. Clean the area around drain plug (5).

6. Remove the drain plug. Install 6B-3156 Pipe Nipple in order to unseat the drain valve. Allow the oil to drain into a suitable container.

7. Remove the pipe nipple. Inspect the drain plug and the seal for damage. If the drain plug or the seal are damaged, replace the damaged components.

Install the drain plug and the seal.

8. Remove the oil filter for the torque converter and transmission oil. Discard the oil filter. Install a new oil filter. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Filter - Replace”.

9. Guide the dipstick down the filler tube and turn the handle on the dipstick in order to make the seal between the filler tube and the filler cap.

10. Start the engine. Run the engine at low idle. Inspect the transmission for leaks.

11. Ensure that the parking brake is engaged. Engage the service brakes. Slowly operate the transmission control in order to circulate the oil.

12. Shut off the engine.

13. Replace Plate (3).

14. Wait for five minutes before removing dipstick (1). Turn the handle on the dipstick in order to remove the dipstick.

15. Clean the dipstick by wiping.

16. Install the dipstick fully.

17. Check the oil level on the COLD SAFE START side of the dipstick. The engine can be started if the oil is anywhere within the shaded area. If necessary, add oil.

18. Lower the hood.

19. Start the engine. Operate the machine until the temperature of the oil is at normal operating temperature.

20. Raise the hood.

21. Check the torque converter and transmission oil level on the “FULL HOT LOW IDLE” side of the dipstick. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check”. If necessary, add oil.

22. Shut off the engine.

23. Close the hood.

i03581363

Torque Converter and Transmission Oil Filter - Replace

SMCS Code: 3067-510; 3101-510-FI

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

Park the machine on a level surface. Engage the parking brake. Lower the truck body or OEM attachment and shut off the engine.

Note: Before you remove the filter, block the front frame of the machine.

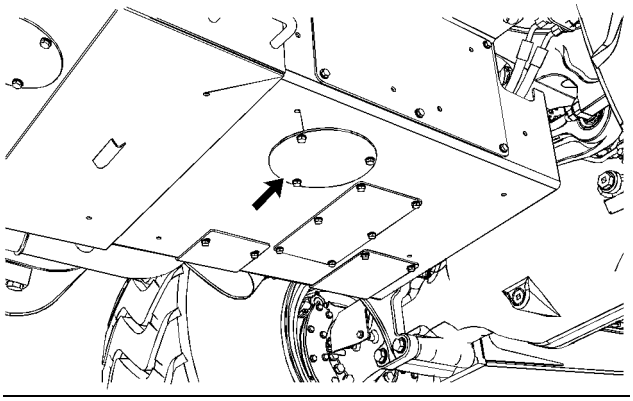

Illustration 219 g01127612

1. Remove the cover in order to access the oil filter cover.

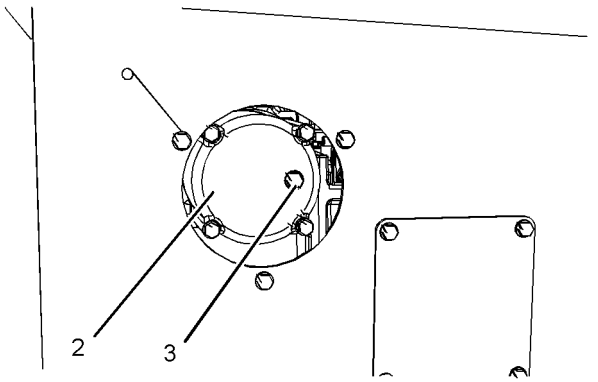

Illustration 220 g01127613

2. Clean the area around drain plug (3). Remove the drain plug and the O-ring seal and retain the drain plug and the O-ring seal. Allow the oil to drain into a suitable clean container.

Note: Approximately 4.5 L (1.2 US gal) will drain from the transmission when drain plug (3) is removed.

3. Remove oil filter cover (2). Remove the O-ring seal and retain the O-ring seal.

Note: Note the orientation of cover (2). The cover must be installed in the position.

4. Remove the nut and the washer that secures the oil filter to the transmission. Remove the oil filter and discard the oil filter.

5. Fit a new oil filter. Fit the washer and the nut in order to secure the oil filter to the transmission.

6. Inspect the O-ring seal for the oil filter cover. If necessary, replace the O-ring seal. Lubricate the O-ring seal with transmission oil. Install the O-ring seal and oil filter cover (2).

7. Inspect the O-ring seal for drain plug (3). If necessary, replace the O-ring seal. Lubricate the O-ring seal with transmission oil. Install the O-ring seal and install the drain plug.

8. Top up the torque converter and transmission oil level with the correct oil. Refer to Operation and Maintenance Manual, “Torque Converter and Transmission Oil Level - Check” and Operation and Maintenance Manual, “Lubricant Viscosities”.

9. Check oil filter cover (2) and drain plug (3) for leaks. If oil leakage is evident, repeat the replacement procedure.

10. Replace the cover on the transmission guard.

i03581366

Torque Converter and Transmission Oil Level - Check

SMCS Code: 3030-535-FLV; 3101-535-FLV

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

The oil level should be checked before starting the engine.

1. Park the machine on a level surface. Engage the parking brake and lower the truck body or OEM attachment.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

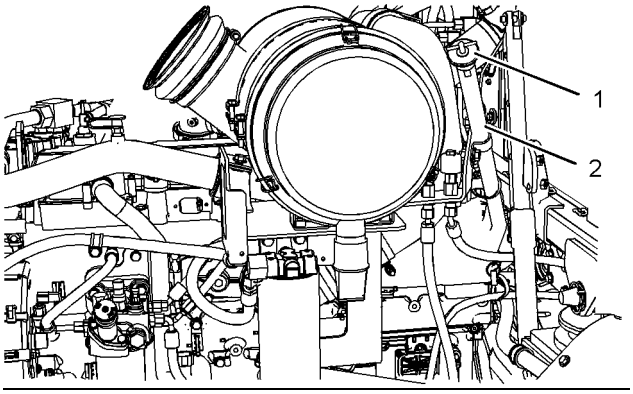

Illustration 221 g01126900

3. Wipe oil filler cap (1) and oil filler tube (2).

Note: The oil level dipstick is integral with the oil filler cap for the transmission oil. Oil filler tube (2) for the torque converter and transmission oil is located on the left side of the machine near the air cleaner.

4. Turn the handle on the oil level dipstick in order to remove the dipstick. Remove the oil level dipstick.

5. Clean the dipstick by wiping.

6. Install the dipstick fully.

7. Remove the dipstick.

Illustration 222 g00740027

Note: The oil level dipstick is marked “COLD SAFE START” on one side. The oil level dipstick is marked “FULL HOT LOW IDLE” on the other side.

8. Check the oil level on the “COLD SAFE START” side of the dipstick.

The engine can be started if the oil is anywhere within the shaded area. **Do not add oil if the level is toward the bottom of the “COLD SAFE START” shaded area.** An oil level that is anywhere in this range is normal.

9. Guide the dipstick down the filler tube and turn the handle on the dipstick in order to make the seal between the filler tube and the filler cap.

10. Lower the hood.

11. Start the engine. Operate the machine until the temperature of the oil is at normal operating temperature.

12. Park the machine on a level surface. Engage the parking brake.

13. Raise the hood. Wait for five minutes before removing dipstick (1). Turn the handle on the dipstick in order to remove the dipstick.

Note: The shaded area on the side of the oil level dipstick that is marked “FULL HOT LOW IDLE” indicates the correct transmission oil level. Refer to illustration 222.

14. Clean the dipstick by wiping.

15. Install the dipstick fully.

16. Remove the dipstick and check the oil level.

17. Check the oil level on the “FULL HOT LOW IDLE” side of the dipstick. Maintain the oil level within the shaded area on the dipstick. If necessary, add oil through filler tube (2). Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

18. Guide the dipstick down the filler tube and turn the handle of the dipstick in order to make the seal between the filler tube and the filler cap.

19. Lower the hood.

i02228028

Torque Converter and Transmission Oil Sample - Obtain

SMCS Code: 3030-008; 3101-008; 7542-008

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

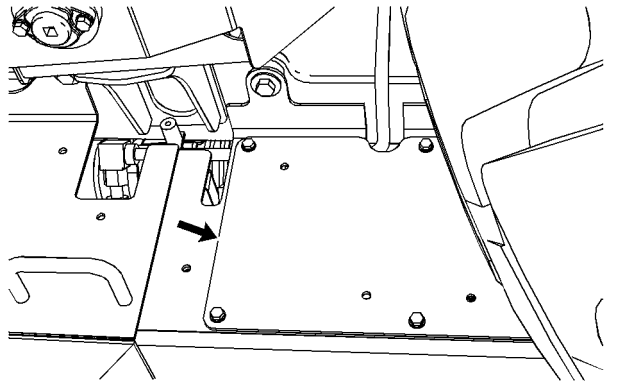

Illustration 223 g01127660

Remove the plate on the left side of the transmission guard in order to access the sampling port.

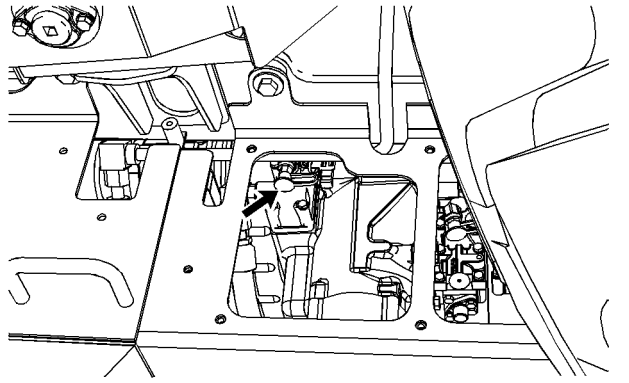

Illustration 224 g01127662

The sampling valve is located on the left side of the transmission.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of the engine oil.

i03581400

Transfer Gear Oil - Change

SMCS Code: 3159-044-OC

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

Operate the machine until the oil is warm and the oil is well circulated. Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

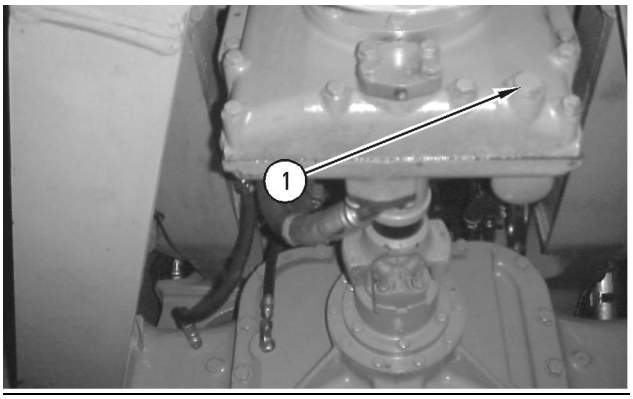

Illustration 225 g00740248

Drain plug (1) for the transfer gear is located on the bottom of the transfer gear case.

Note: Before you change the oil, block the front frame of the machine.

1. Remove the drain plug and allow the oil to drain into a suitable container.
2. Clean the drain plug and install the drain plug.

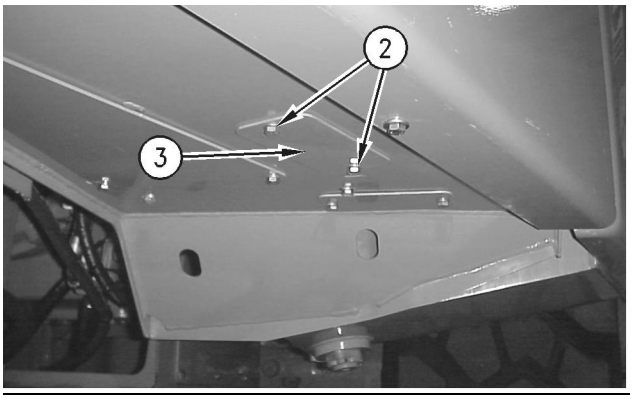

Illustration 226 g00740253

3. Remove bolts (2) and cover (3) from the machine. This will allow access to the drain plug for the transfer gear oil tank.

   The drain plug is located underneath the machine on the front left side.
4. Remove the drain plug and allow the oil to drain into a suitable container.
5. Install the drain plug, cover (3), and bolts (2).
6. Raise the hood.

Refer to Operation and Maintenance Manual, “Hood Control”.

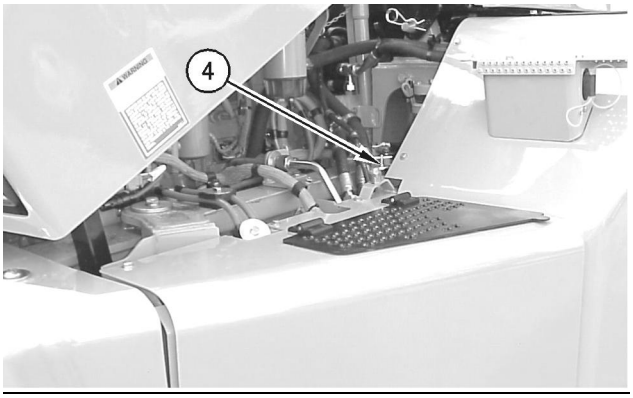

Illustration 227 g00702070

7. Oil filler cap (4) for the transfer gear oil tank is located on the left side of the engine compartment. The oil level gauge is attached to the oil filler cap.

8. Unscrew and then remove the oil filler cap. Add the oil for the transfer gear.

Refer to Operation and Maintenance Manual, “Capacities (Refill)” and refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

9. Clean the oil level gauge and the oil filler cap. Install the oil filler cap.

10. Start the engine. Operate the machine until the oil is at operating temperature. Inspect the transfer gear case for leaks.

11. Remove the oil filler cap and check the oil level on the oil level gauge.

Note: Refer to Operation and Maintenance Manual, “Transfer Gear Oil Level - Check” for more information.

12. Clean the oil level gauge and the oil filler cap.

13. Install the oil filler cap and tighten.

14. Shut off the engine.

15. Clean up oil spills.

16. Lower the hood.

Refer to Operation and Maintenance Manual, “Hood Control”.

i03581423

Transfer Gear Oil Filter - Replace

SMCS Code: 3159-510-FI

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Park the machine on a level surface. Ensure that the parking brake is fully engaged. Lower the truck body or OEM attachment and shut off the engine.

Drain the oil before removing the oil filter. Refer to Operation and Maintenance Manual, “Transfer Gear Oil - Change” for information on draining the oil.

Note: Before you change the filter, block the front frame of the machine.

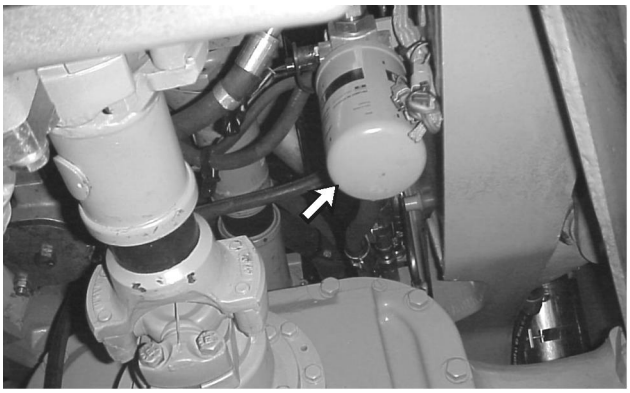

Illustration 228 g00742910

The oil filter for the transfer gear is located on the rear of the tractor on the right side of the rear frame.

1. Clean the outside of the oil filter for the transfer gear.

2. Remove the oil filter with a strap type wrench. Discard the used oil filter properly.

   Refer to Operation and Maintenance Manual, “Oil Filter - Inspect”.

3. Clean the oil filter base.

4. Apply a thin coat of oil to the seal of the new oil filter.

5. Install the new oil filter by hand. When the seal contacts the oil filter base, turn the oil filter by 270° more. This will tighten the oil filter sufficiently.

i03581442

Transfer Gear Oil Level - Check

SMCS Code: 3159-535-FLV; 3159-535-OC

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Check the oil level before the engine is started.

1. Park the machine on a level surface. Engage the parking brake and lower the truck body or OEM attachment.

2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

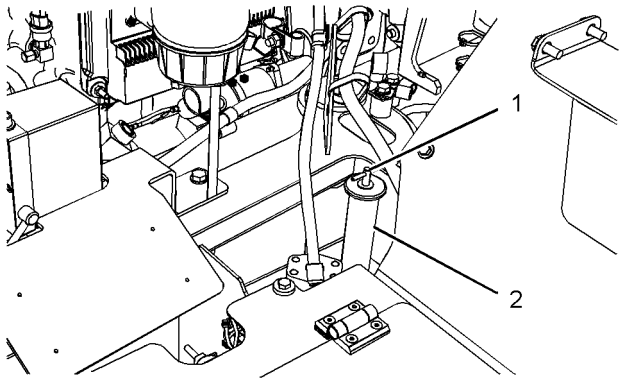

Illustration 229 g01125860

3. Wipe oil filler cap (1) and oil filler tube (2).

Note: The oil level dipstick is integral with the oil filler cap for the transfer gear. Oil filler tube (2) for the transfer gear is located on the left side of the engine compartment.

4. Turn the handle on the oil level dipstick in order to remove the dipstick. Remove the oil level dipstick.

5. Clean the dipstick by wiping.

6. Install the dipstick fully.

7. Remove the dipstick.

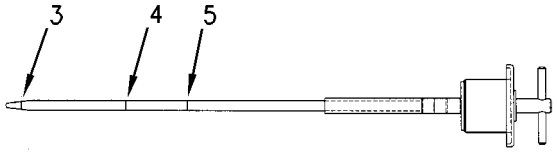

Illustration 230 g00740112

Note: The oil level dipstick is marked: “MIN COLD” (3) , “MIN HOT” (4), and “MAX HOT” (5).

8. Check the oil on the dipstick.

Note: The engine can be started if the oil is above the mark “MIN COLD”(3).

9. If necessary, add oil through filler tube (2) until the level is at the “MIN COLD” mark. Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

10. Guide the dipstick down the filler tube and turn the handle on the dipstick in order to make the seal between the filler tube and the filler cap.

11. Lower the hood.

12. Start the engine. Operate the machine until the temperature of the oil is at normal operating temperature.

13. Park the machine on a level surface. Engage the parking brake. Shut off the engine.

14. Raise the hood. Remove oil level dipstick (1).

15. Clean the dipstick by wiping.

16. Install the dipstick fully.

17. Remove the dipstick.

18. Check the oil level on the dipstick. If the oil is between the range “MIN HOT” (4) and “MAX HOT” (5) this is normal. Maintain the oil level within this area on the dipstick. If necessary, add oil through filler tube (2). Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.

19. Guide the dipstick down the filler tube and turn the handle of the dipstick in order to make the seal between the filler tube and the filler cap.

20. Close the hood.

i03581500

Transfer Gear Oil Sample - Obtain

SMCS Code: 3159-008; 3159-554-OC

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

⚠ WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

Illustration 231 g00847341

Location of the sampling valve for the transfer gear

1. Operate the machine until the oil reaches operating temperature.

2. Park the machine on a level surface. Lower the truck body or OEM attachment and engage the parking brake.

3. Shut off the engine.

4. Install the steering frame lock. Refer to Operation and Maintenance Manual, “Steering Frame Lock”.

Note: Before you obtain a sample of the oil, block the front frame of the machine.

5. Install the oil drain tube assembly to the sampling valve.

6. Start the engine.

7. Drain an oil sample from the sampling valve.

8. Shut off the engine.

9. Remove oil drain tube assembly from the sampling valve.

Use S·O·S oil analysis in order to monitor the condition of the transfer gear.

i02889528

Wheel Nut Torque - Check

SMCS Code: 4210-535

Check the wheel nut torque on any wheel that has been mounted or remounted. Continue to check the wheel nut torque at every 10 service hours or on a daily basis until the wheel nuts maintain the specified torque.

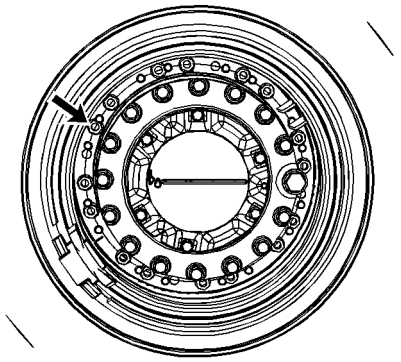

Illustration 232 g01125960

Tighten the wheel nuts to a torque of 475 ± 60 N·m (350 ± 44 lb ft).

i01401274

Window Washer Reservoir - Fill

SMCS Code: 7306-544

NOTICE
When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

Illustration 233 g00738419

The window washer reservoir is located inside the engine compartment on the left side.

Perform the following operations in order to access and fill the window washer reservoir:

1. Park the machine on a level surface. Engage the parking brake and shut off the engine.
2. Raise the hood. Refer to Operation and Maintenance Manual, “Hood Control”.
3. Remove the filler cap of the reservoir.
4. Fill the reservoir through the filler opening.
5. Replace the filler cap of the reservoir and lower the hood. Refer to Operation and Maintenance Manual, “Hood Control”.

i03581520

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

Park the machine on a level surface. Engage the parking brake. Lower the truck body or OEM attachment and shut off the engine.

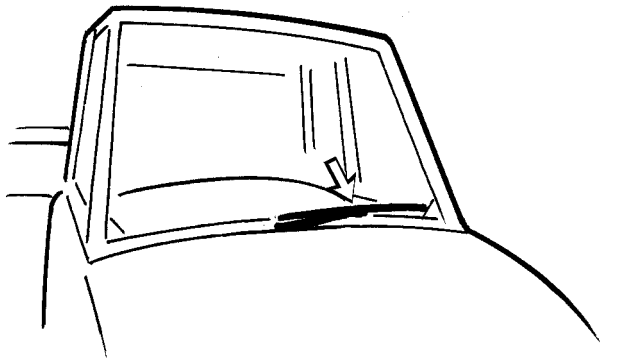

Illustration 234 g00776803

Inspect the front wiper blade. Inspect the rear wiper blade, if equipped.

Replace a wiper blade when the following conditions occur:

- The wiper blade is causing streaks on the front window.
- The wiper blade is causing streaks on the rear window.
- The wiper blade is worn.
- The wiper blade is damaged.

Note: Damaged wiper blades may cause permanent damage to the glass of the cab windows.

i01495125

Windows - Clean

SMCS Code: 7310-070

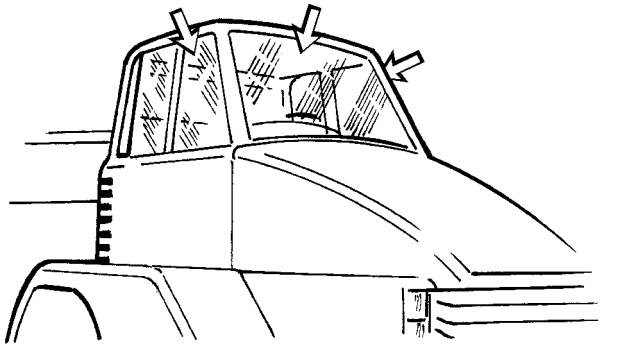

Illustration 235 g00776437

Use commercially available window cleaning solutions and a clean cloth to clean the windows. Clean the outside of the windows from the ground unless handholds can be utilized from positions on the deck.

Use a device with a long handle or steps in order to clean the windows from the ground.